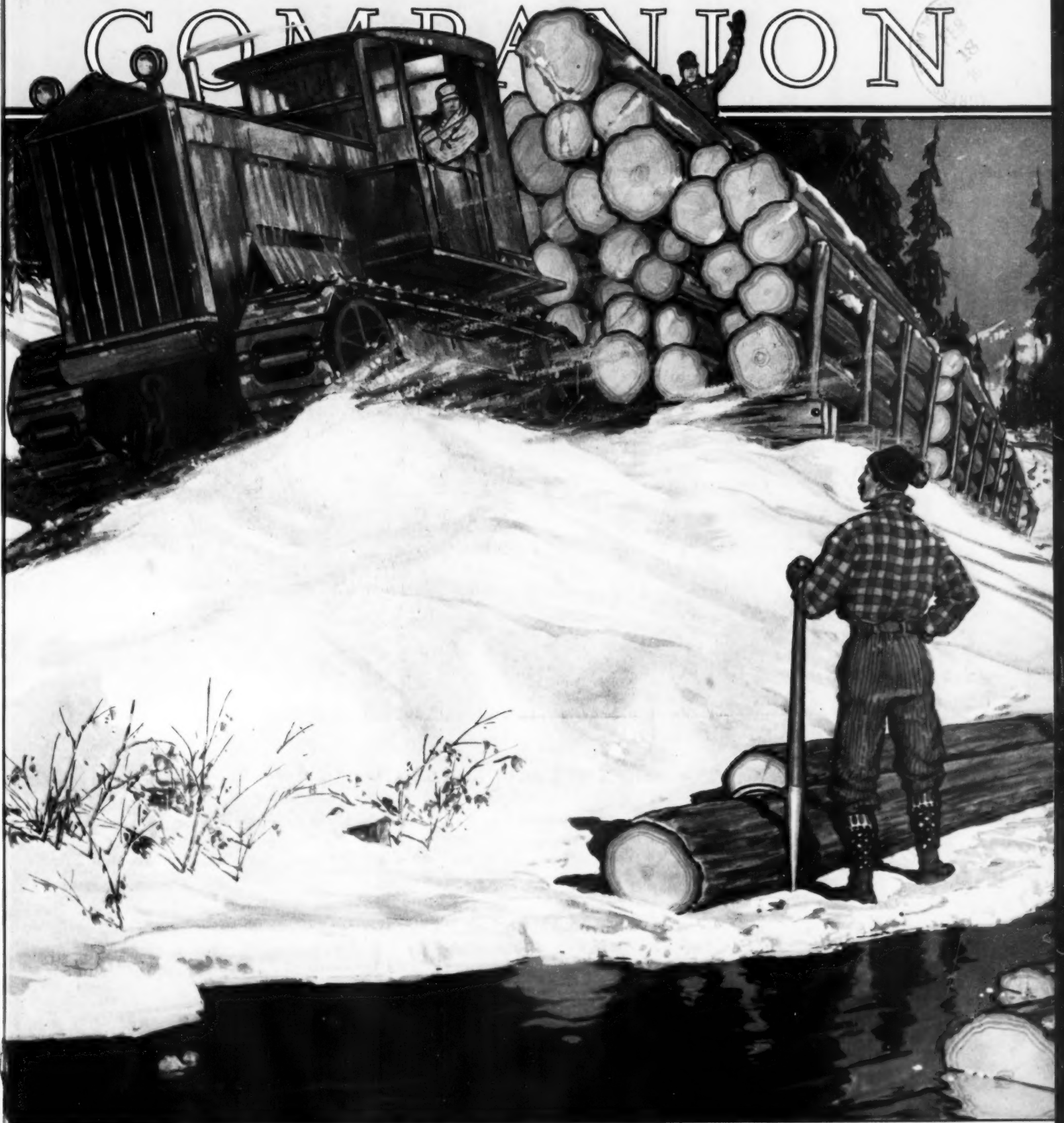


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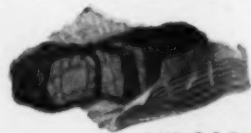
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"The blackness of that night in our little prairie town was like the horrible blackness that fell upon Pompeii when Vesuvius destroyed it," said Rosselyn. "And we were two thousand miles from the spot where Nesbit pressed the key"

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The Rosselyn Experiment

A Story of the Next Century

By John Winthrop Hammond

ILLUSTRATED BY FREDERIC DORR STEELE

THERE was a smell of rain in the fresh east wind. The sky was leaden gray. George Meaker paused as he came over the brow of the little hill, and for a long moment he stared at the unlovely scene before him; then he shook his head slowly, a frown of disappointment on his lean face. Of course he had been warned that Rosselyn was a fraud. Only last week he had heard someone at the club refer to "that faker Rosselyn." Could this ugly mass of towers and wires and tumbledown shacks really be a great scientist's laboratory?

Like huge spokes, radiating from a group of unpainted farmhouses which seemed tiny in comparison, were great lines of iron towers, tall and slender, making a tremendous fanwheel pattern over the landscape. Connecting these towers was an intricate maze of wires, through which the wind whistled and moaned.

Already it was getting darker. To Meaker's restless and uneasy glance, the farm-laboratory seemed more and more sinister in the fading light. There was no sign of life

about the place. A shiver went up George's spine. He felt that here he was to have a strange and thrilling experience.

Down the sharp slope he plunged, then along the uneven driveway to the silent house. Just as he gained the sagging porch, the weather-beaten door opened, and a tall, solid-looking man appeared. He smiled an odd, quick smile as he held out a supple hand. His welcoming words were terse but reassuring.

"Come in. Sit down. Be comfortable."

Meaker took the extended hand.

"I've no idea what you want with me," he said, bluntly. "I'm going to ask you to come to the point quickly."

They walked inside. The large room showed a curious contrast. At one end was a fireplace, cheerful with blazing logs. The whole side of the room was as pleasant as a country-club lounge—a rug on the floor, leather-covered chairs scattered about, a footstool, a taboret and a piano. Everything was a little shabby, but looked comfortable. The other side of the room presented as complete a contrast as possible. Under a large window was a long workbench, littered with tools and odds and ends of paraphernalia; tables were piled high with technical books, magazines and small filing cases; groups of storage batteries were scattered carelessly about the bare and dirty floor; and among them, incongruously, was a fine transceiver, or visual radio set, encased in a beautifully carved cabinet. A football game showed on the screen, the cheers at times filling the room.

Rosselyn dropped into a chair on one side of the fire and waved his guest to the chair across the hearth. Meaker sat down, his sense of uneasiness increasing. The men looked at each other searchingly for perhaps ten



Halfway across, a blast of terrific heat struck Meaker full in the face. He fell sideways, writhing, his hands in front of his face

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seconds. George's heart was beating fast with a vague premonition.

"Glad you came, Meaker," Rosselyn spoke slowly but crisply. "I was beginning to fear you'd disappoint me."

"I promised, and so I came," said George.

"Yes, you're too good an aviator to be unreliable. I watched you for more than an hour at the fair grounds while you stunted your plane. You're very good at it."

"Thank you," replied George. He was wondering where the conversation was leading.

"But I didn't invite you all the way out here merely for compliments," continued the inventor. "I'm looking for the right sort of an assistant—the right sort. He's got to have lots of nerve, for one thing. Your flying proves you've got that, and to spare. For another thing, he's got to have some technical background. Do you know anything about radio?"

"Why, yes, a little," George replied dubiously. "Not what you'd consider worth very much. I always carry a two-way set on the plane. And I've studied it at Laneburg Tech. Last winter I followed the Croftdale lectures pretty well."

Rosselyn nodded, and fell into a brown study. Then he looked up sharply. "Very good. Very good indeed. But there's one other factor of the highest importance—"

He broke off suddenly. "I've had a disappointing experience with a former assistant. He mocked me, and then he betrayed me. I don't want that to happen again."

George looked straight at the burning eyes. "I'm not in the habit of double-crossing people," he said pointedly.

"Forgive me, Meaker," Rosselyn said quickly. "I meant no offense. I want to be absolutely frank with you, because my work is much too important to be interfered with by petty intrigue or malice. Will you give me your word of honor that everything you hear and see on this place is to remain a secret, so far as you are concerned?"

George, without hesitation, offered his hand. "Yes, of course," he said. They shook hands firmly.

Rosselyn pulled out a stubby pipe and began to fill it. "Perhaps I've seemed a little mysterious so far. You'll have to stand a certain amount of mystery from me as long as we're together. Some secrets of science are best locked up in one man's brain—the right man's brain."

He puffed away vigorously, squinting into the fire. When he spoke again, it was in a subdued, half-dreaming way.

"I suppose you know the history of aviation. That began about a century ago with the Wright brothers. Since then, through more than a hundred years of wonderful scientific development, the designers and engineers have produced only refinements—nothing really new in the way of design or motive power. In this twenty-first century we have airplanes circling the globe; all the big cities are connected; and we have large freight planes, passenger planes, police planes—you know all that. And it's really not much different from the twentieth century. I have something else in mind." The inventor again lapsed into silence.

George was frowning. "Am I to infer, then, that you have some new type of plane you want me to experiment with?" He asked.

"In one sense, yes," Rosselyn said. "Everything we have now is long-distance flying. Twenty-six air levels up to the 'Comet Express,' four miles up. What I'm after is community flying."

"Community flying?" George repeated wonderingly. "You mean from one city to the next—inter-town flying?"

"Not at all!" Rosselyn answered quickly. "I mean flying within the limits of one town or city—flying that would be equivalent to riding in a taxicab or in a trolley car."

"Seems to me that would be pretty dangerous," George said dubiously. "Planes are pretty big, and it takes a long time to make a pilot. Imagine there would be crashes all over the place."

"Not in my planes!" Rosselyn cried triumphantly. "They'll be so small it will seem like putting wings on people's feet. Small! And under perfect control all the time!"

"What about the power plant?" George demanded. "If it's going to be so powerful, it'll take up a lot of room, and the weight will require large wings."

Rosselyn began to puff at his pipe, saying nothing. Then he said slowly, almost ominously, "I may have far to go yet, but I've made a beginning." His eyes were glazed with intensity. Once again George felt a stab of premonition. Then came a rush of words.

"Do you know what wavelengths have been produced and what haven't? Do you know what

the electrons do in a vacuum tube exhausted to a ten-billionth of an atmosphere? Have you any theories about high frequency?"

George was so startled by the onslaught of these questions that he could only nod in reply.

"I'm working with radio—and certain other forces," Rosselyn went on. "In fact, I intend to develop a small, one-passenger plane to be driven by energy created through the destruction of matter. The Nesbit discovery—"

At the word Nesbit, the hair at the base of George's neck began to tingle, and his heart grew sick with horror. He sat for a second as if frozen—then, with a hoarse cry of rage, he leaped from his chair and hurled himself across the hearth.

He did not reach Rosselyn. Halfway across, a blast of terrific heat struck him full in the face. He fell sideways, writhing, his hands in front of his face, his eyebrows and hair singed. A newspaper on the taboret began to turn brown along the edges; then it curled up and burst into flames.

Suddenly the heat ceased. George got to his feet dazedly, while Rosselyn—as if nothing important had happened—walked calmly to the taboret and beat out the fire with a glove.

"I expected your outburst," he remarked quietly. "The idea that anybody knows Nesbit's secret carried you off your feet. That's quite natural. Nobody has forgotten the day, twelve years ago, when Nesbit made a tiny but terrible error."

Rosselyn was actually smiling now, and his eyes crinkled with amusement. "I'd have been a dead man if I hadn't stopped you with my radio heat gun—now, wouldn't I?"

He was the picture of geniality. But George clamped his jaws shut and moved toward the door.

"That's useless," remarked Rosselyn, quietly. "This door is safely locked. You are my prisoner, Mr. Meaker, and I don't intend to let you turn me over to the police."

He was lounging in his chair, blowing smoke rings. In spite of himself, George could not maintain his feeling of rage and resentment. The physical shock of meeting the blast from the radio heat gun had not subsided, and he was glad to stumble to a chair and collapse into its thick leather cushions. He was unable to speak.

"Do you—have you really discovered Nesbit's secret?" stammered George, at last.

Rosselyn nodded slowly.

"I have," he said. After a long pause he began again. "And the next thing is to know what to do with it. When you reflect upon this conversation of ours, you'll realize



A hundred feet away, they lay on the grass and panted. . . . Rosselyn's face was a study in bewilderment. "But it wasn't instantaneous!" he muttered

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I could scarcely have had a destructive purpose in mind, or why should I have taken the trouble to invite you here and tell you my secret?"

"But Nesbit—"

"I'm not a madman, as Nesbit was," interrupted Rosselyn, "I don't want to annihilate the world." He paused as if inviting an answer, but George found nothing to say.

"Mr. Meaker, your fears are groundless. I am as anxious to preserve the world from the destructive effect of this discovery as you are. But can not it be made useful, as well as destructive? Consider how mankind dreaded the thunderbolts before electricity was harnessed. Consider the terror of the sea before large ships were built. I want to make a tiny airplane, and here is the tremendous new power such a project requires. Let us keep Nesbit's name out of it. The public remembers him so well that I would not be allowed to live if they knew I held his secret. You have just demonstrated that."

He laughed shortly. "I need your confidence and assistance," he went on. "I can't make the necessary experiments alone—or build the apparatus needed. So, if you will promise, first, to study my notes and preliminary experiments, and, second, to refrain from handing me over to the police until you have done so, I think we will come to understand each other perfectly."

"But Nesbit!" said George, with a shudder. "Nesbit was a fiend. How can you make anything useful out of the methods of a man who strove to destroy the whole world?"

Rosselyn did not answer immediately. He mused for a moment, got up to switch off the noisy transcaster, and then resumed his comfortable slouching position.

"Perhaps," he said, slowly, "you don't remember what happened quite as clearly as I do. I am much older than you. On the night of May 16, twelve years ago, I was at my home in Oklahoma, walking in the street. It was a black, moonless night, very quiet. Suddenly the ground began to shake violently; I felt it was an earthquake, and I instinctively threw myself flat on my face. There was a great noise of window glass crashing, and many brick walls fell. People began to appear on the streets in their night clothes. Many were bleeding from cuts. Short circuits had started fires along my street, but the engines were all clanging away toward Main Street, trying to save the more important buildings. I rang doorbells to make sure everyone was out, so that any succeeding shocks would not bury them in wreckage. Soon it began to rain—big drops that were scalding hot. Then came the wind, a whooping gale from the east that lasted about five minutes, and was followed by strong winds from the north.

"Have you ever read Pliny's letter about the destruction of Pompeii and the other havoc wreaked by the eruption of Vesuvius? No? Well, you should; it is the most vivid description of a disaster in all literature; the blackness of that night in our little prairie town was like the horrible blackness that fell upon Italy. And we were two thousand miles from the spot where Nesbit pressed the key that unloosed the cataclysm—"

Rosselyn shivered a little, in spite of his iron self-control.

"All the United States suffered from that shock," he went on. "The picturegrams and transcasters told the whole story next day. You are old enough to remember the terror they caused, are you not? The most awful devastation was along the Atlantic coast, from Maine as far south as Central America. People saw the sky flaming bright red—and huge waterspouts and tidal waves. The biggest was off the New Jersey coast, I think. Property



There was a tremendous, solemn detonation just as they reached the head of the stairs. The whole building was swaying crazily. George saw the carefully tended apparatus a mass of twisted, broken junk

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damage was enormous. Billions of dollars! In places with low elevation, like Rhode Island and Florida, the water burst miles inland, wrecking cities and transportation lines.

"The reason for it all was a mystery. All the seismologists agreed that it couldn't have been an earthquake or a natural eruption. They simply didn't know. But I know. I discovered the truth within forty-eight hours."

ROSSELYN looked keenly at George, as if expecting another outburst. But George was staring into the fire, absorbed in the story.

"It was pure luck, of course," the inventor continued. "I spent most of the fortnight following the disaster touring the surrounding countryside, listening to the tales people were telling of their personal experiences, and observing the damage wrought. I met two State police looking for a crazy man who had been put off a passenger plane at Guthrie, badly scalded from the hot rain. He'd escaped from the hospital.

"On the afternoon of the second day I came across this lunatic in a pasture, while I was taking a short cut between villages. He was sitting on the ground, swaying his body, and alternately moaning and laughing shrilly. I couldn't get him to answer me. Finally he started to talk to himself. 'Ripped to rags!' he said. 'The greatest force in the world. How many—how many millions?'"

George sat up abruptly. "Good heavens!" he cried.

"It was Nesbit! But—why, the man who found him was named Blann!"

Rosselyn smiled grimly and nodded. "I see you remember, all right. Yes, Blann is my name. But after the affair was over I changed my name to Rosselyn. The public attitude toward scientists has changed since the disaster. Every researcher and experimenter is under suspicion. And if I'd kept my name I'd have no freedom at all."

Rosselyn looked affectionately at the far end of the room, where his littered workbench stood.

"Well," he resumed, "those were the last words Nesbit ever spoke. Soon after he fell into a coma. I tried to bring him around, but I didn't succeed. Then I started carrying him to the nearest road, where I could pick up a lift and take him to a hospital. He was a bit too heavy for me; but in my trying a bulky envelope slipped out of his breast pocket. Inside I found the story of his great secret."

"As I recall it," George interposed, "there was a long typewritten statement giving his complete plan. But he didn't tell the way to go about it. I remember that the newspapers said the secret had died with the fiendish scientist."

Rosselyn grinned. "That was not the whole story. I gave the typewritten sheets to the world to throw suspicion away from me. Actually I found the real secret in a little notebook, full of Nesbit's scribbling. I kept that quiet. It contained his actual laboratory notes, describing in principle the steps he had taken in reaching his colossal achievement—"

"Achievement?" George interrupted again. The glance he gave the inventor was challenging.

"Yes, sir," was Rosselyn's emphatic reply. "Meaker," he cried, pounding his fist on his knee, "I don't care what the world thinks of this thing! I tell you it's a big thing—a constructive discovery! It's capable of more good than harm! Nesbit miscalculated his forces, and wrecked this country so badly that the World Federation has passed the Earth Preservation Law. I can't blame them. But as for me, I call his discovery an achievement just the same!"

"But it's your discovery now, isn't it?" George suggested. "You've rediscovered it, haven't you? You can do it, too—or have done it, for all I know?"

Rosselyn leaned forward and stared hard at George. His face held a look of frank, almost naive, acknowledgment. "I know the process from beginning to end," he answered slowly and impressively. "And I've done it—on paper. But not in practice. I'm ready for that next step now! Then I can build a model for my little airplane, mount my new engine in it, and set her going. I need a good assistant—I need you—for both those steps."

George reflected deeply. Here was a man who had taken a dead man's terrible secret. Then he had changed his name and worked on the secret to bring it to fruition. He had broken the strictest of all laws of the country—the Earth Preservation Law. It certainly looked bad.

On the other hand, Rosselyn seemed sincere. Apparently he was honest in saying he wanted to develop this terrible power for the good of the world.

"Just suppose," said George, "that your experiment turns out like Nesbit's—or worse? It may be a good thing to give the world this new source of power, but is it worth while taking the risk of destroying the world to get it?"

"I've gone Nesbit a step or two better," said Rosselyn. "He was working in the dark. He tried his experiment too soon. I suppose he foresaw that there might be more energy released than he counted on, and so he must have dropped his apparatus into the ocean, and then set

it off by some distant-control device. I propose to do a similar experiment on a much smaller scale, and with a number of refinements."

Again George pondered the matter. By now he was beginning to see that, whatever law Rosselyn was breaking, he was certainly keeping within the law of common sense.

"I'm asking you to share in my efforts and to help me in this final stage," said Rosselyn earnestly. "Neither of us has much to lose; but we have everything to gain!"

There was another moment of hesitation. Then George stood up and held out his hand without a word. Rosselyn's eyes lighted as he took the proffered hand.

"Lad," he cried, "you don't know how you hearten me!"

CHAPTER TWO

The Great Experiment

THREE days later George made his last flight for the A-trial Amusement Company. He was in the midst of packing when there came a knock on the door. The visitor proved to be a puffy-faced young man, a stranger.

"You're Meaker?" he inquired with a rather insolent intonation.

"My name's Meaker," George replied.

"What's up?"

"I just thought I'd tell you you're making a big mistake to work for Julius Rosselyn. He's no good!"

George's initial dislike for his visitor now became antagonism. "That's awfully nice of you, to come over and tell me," said George with elaborate politeness. Then his voice became curt. "But what business of yours is that? Who are you, anyway?"

"I'm Greenfinch. Work over at the main hangar. Naturally, I heard about your plans."

"Oh," said George, "and so you thought you'd unselfishly go out of your way to set me right!"

Greenfinch had apparently not expected sarcasm. He was a little disconcerted, and put on a louder tone. "I know what I'm talking about!" he cried. "I used to work for him—four rotten months. He treated me dirt mean. He's tricky—and loony, too. A sneak! Watched me like a lynx! Spent a fortune on a crazy antenna big enough to get a message from Mars! He's spending other people's money like water!"

"Well," said George evenly, "it seems to me he couldn't have treated you badly enough. And now get out before I throw you out!"

Greenfinch glared at George, then turned on his heel and went away without a word.

The whole situation seemed perfectly clear to George. This Greenfinch had been the assistant Rosselyn had been talking about—the fellow who had mocked and betrayed him. Of course Rosselyn had tested him out pretty thoroughly before letting him in on any secrets, and it was obvious why Greenfinch had failed to pass the test. Reflecting on the matter, George began to see it as a great compliment that Rosselyn had told him so much after such short acquaintance. He decided not to bother Rosselyn by telling him of the unpleasant incident.

The next morning George installed his few belongings in the room of the old farmhouse which was to be his, while Rosselyn, vibrant with cheerful energy, began immediately to talk about their work.

"Right now my proposition is a two-headed affair," he said. "First, produce the energy; second, apply it to the little airplane. The whole thing must be as small as we can make it."

They were downstairs again. "See that framework?" asked Rosselyn. "That's the tungsten steel tube skeleton of the plane. Light and strong. Just as soon as we get the radio question solved—"

"Radio!" George cried. "What's radio got to do with it? Do you expect to fly on radio waves? Is that why you have that big antenna outside?"

Rosselyn shot him a keen glance. He laughed dryly. "Oh, I've given up all idea of using big antennæ. I was a little foolish about that, perhaps. My last assistant tried to convince me that he knew more about radio than I did. I believed him, unfortunately. I thought I could trust him."

"And all for nothing!" George exclaimed.

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"Oh, I'll salvage it," Rosselyn replied. "I'm going to take it down some day. You may have noticed that there's no one working around the place except myself. I let my little crew of workmen lay off after my final scene with that infernal assistant. I'll set 'em to work again pretty soon."

In spite of himself, George could not help remembering Greenfinch's description of Rosselyn as "loony." Using as casual a tone as he could, George said, "When I first saw that antenna, I thought to myself that it's about large enough to pick up a message from Mars—if there were anyone on Mars to send a message."

Rosselyn smiled. "There would be more 'ifs' than the one you mention, I'm thinking." Then he grew serious. "But what do I want with messages from Mars? All I want to know is how to transmit power by radio."

By this time George was sure that Greenfinch was really the former assistant, and he speculated upon the different versions of how the antenna came to be built.

THE days and weeks passed pleasantly enough. Soon after an early breakfast, the two would go to the laboratory and work with perfect absorption. Little by little Rosselyn would reveal to George what was in his mind. Day by day parts of the whole picture would be sketched in. For the most part, George's work was the exhaustive testing of pieces of apparatus, designed by Rosselyn and built by the two of them. Then George would go over his computations, study them, pick out the significant phases of the experiment, and show his results to Rosselyn. The latter would then stop his own work, check each step of George's work, praise him or scold him, and finally explain the whole experiment and its significance for the realization of the final goal.

By the middle of February everything was finished. Then followed three laborious weeks of work, checking and rechecking every step of the way. Rosselyn kept repeating, "We've got to be absolutely right! We've got to be absolutely right!"

At last, on a Wednesday in late March, came the great day—the time to make the great experiment. Both of

them rose earlier than usual; they barely touched their breakfast; they scarcely spoke a word; yet neither of them would for the world have admitted being the least bit nervous.

That morning George for the first time saw the laboratory on the second floor of the barn, where the test was to be made. Although the room was unusually large, every available inch of floor space, beyond what was needed for passageways, was occupied with a formidable assemblage of apparatus. A turbine generator stood at one end, flanked by a large battery of transformers. One whole section was devoted to a forest of radio tubes of all sizes, next to which were several strange-looking pumps and half a dozen large cylindrical steel tanks. On the ceiling and round the walls was an elaborate wiring system. A large switchboard took up most of the rear end of the room.

Threading his way through the paraphernalia, Rosselyn stopped at a large granite boulder that had been solidly fixed in a bed of cement.

"See that?" He was pointing to a small oblong box of metal, set in at the top of the boulder. George nodded eagerly.

"That's the scene of operation," said Rosselyn in a low voice, as if he were afraid someone would overhear. "That's the metal container, or crucible, or retort—whatever you want to call it. It's made of laminated slabs of specially treated tungsten, six inches thick on all sides. Tungsten, you know, can stand a lot of heat."

George stared at the little metal box in fascination. But with all his awe he was also intensely curious. On the farther narrow end, he saw, there was a kind of sealed cap, through which passed a pair of heavily insulated wires, a length of rubber tubing, and a rigid shaft, on the end of which was a pinion meshed with a ponderous cast-iron toothed wheel, the shaft and wheel mounted in bearings.

"Well," he said at length, "I don't doubt what you say. But what has all this to do with it?" He waved his hand at the phalanx of equipment around the room.

"Everything—to be exact," replied Rosselyn with a smile at George's bewilderment.

George uttered a cry of astonishment. "What! You don't mean to say you've got to have all this roomful of stuff on your little plane?"

Rosselyn started to answer, then bit his lip. He walked slowly round the boulder, inspecting it critically as if he had never seen it before. Then he returned to George.

"Meaker," he said deliberately, "I trust you. I trust you more than I've ever trusted any man before. And yet—I don't want to tell you everything, even now. Please don't misunderstand me! For one thing, I've never yet actually tried this experiment. I'm going to try it for the first time in about ten minutes. So bear with me—will you, lad?—and just be satisfied with this much knowledge: in that tungsten case there is a tiny particle of uranium, upon which I propose to play certain reactions. If the experiment is successful, the uranium will be destroyed and release a great deal of energy. We can easily tell by the movement of this wheel." He patted the heavy gear. "If it's unsuccessful, we'll have to start all over again."

George shook his head reassuringly. "No fear of that, after all this preparation."

Rosselyn shrugged his shoulders. "Are you ready?" he asked. "We shall now make our first practical trial of the destruction of matter!"

At the switchboard Rosselyn very carefully inspected all the connections. Then, leaving George to repeat the inspection,—"We've got to be absolutely right!"—he made a tour of the room, examining each piece of equipment and every connection.

"Seems all right," he said nervously. "Are you ready?"

George's breath was coming fast. He nodded.

"Then we're off!" said Rosselyn tensely. In slow succession, giving the generator time to pick up, he closed switch after switch. Little whirs and hums, followed by dronings and rhythmic metallic grunts, began to fill the air as the different pieces of apparatus came into

[CONTINUED ON PAGE 92]



Times-World

High above the earth, this tri-motored Ford monoplane carries fourteen passengers through sunset-tinged clouds

A Ride on the Lindbergh Limited

Lindbergh Flies On: III

By Casey Jones

AS TOLD TO EARL REEVES

IN a few weeks you will be able to walk up to an ordinary ticket window beneath the great dome of the Pennsylvania Station, in New York, and buy a ticket for Los Angeles on the Lindbergh Limited.

The youthful Colonel's name will not be on the ticket, which will be good for one passage over the first air-rail line—Transcontinental Air Transport. Nor will he be in any way an owner-pioneer, as was Hill, or Harri-man, or Gould, in railroading. Nevertheless, this new transportation system, which I have called "the biggest thing since Kitty Hawk," already begins to stand in the public mind as the Lindbergh Line.

The justice of calling it so has been shown in the second article of this series, describing his work in his new civilian job. Regarding that, I can quote you something that ranks as very high authority. Gen. W. W. Atterbury, president of the Pennsylvania Railroad, says: "Colonel Lindbergh has contributed more than any other single person to preparing the country for aviation: he is today contributing more than any other person toward preparing aviation to serve the country."

That, it has seemed to me, is a rare and inspiring tribute to youth.

I had thought that I would take you for a ride on this Lindbergh Line. The very pasteboard which you get at the window, General Atterbury has told us, must represent a guaranty of a journey to be completed in comfort and safety and on scheduled time.

We had to take the guess out of aviation. The ticket entitles us to a berth in a special Pullman car. Our train pulls out at 6:05 p.m. of, let us say, a Monday evening.

On Tuesday morning at eight o'clock we find ourselves, still in our Pullman, on a siding alongside a great air field near Columbus, Ohio. Between us and the field is something new—our first air-rail station. But, inside and out, it has but slight resemblance to a railway station. An architect has labored long to give it beautiful lines; perhaps it is accurate to say that it looks rather more like a small country club than like the "depot" with which millions are familiar.

Those passengers who have not had breakfast in the Pullman train may go through a waiting-room into a dining-room for breakfast, or pass on through that to a terrace, from which they may watch the myriad activities of the airport as they eat. Having "aviation with their meals" is destined to become a new treat for America, and a popular one. In fact, the outdoor terrace which runs the full length of the station and beyond is to become a popular rendezvous for hundreds who are not yet traveling by air, but who are eager to come and see the stir and bustle of take-offs and arrivals.



Times-World

Above, Colonel Lindbergh with Lt. W. C. Cornelius (left) and Lt. Irwin A. Woodring, the two survivors of the famous trio of Army flyers known as the Three Musketeers. At left, a rare portrait of Colonel Lindbergh, taken when he was 23 years old and a student at Kelly Field



The waiting-room inside, occupying the central section of the station, is about seventy feet square, but you look in vain for iron-armed wooden benches. Air travel is *de luxe* travel, and luxury is the keynote here. An interior decorator has had a hand in making this a rest room, cushioned and comfortable—like a club-house.

To the right, opposite the dining wing, is a section which will snare your interest, and keenly, when I tell you that in a corner the crack pilots of the line have their own private club-room and bath and locker-room—and in some stations a dormitory where they may sleep between trips when necessary. In this wing also

are the meteorologist,—more of him later,—the station-master, telephone, telegraph and wireless.

The Giant Plane

But we are a long while coming to the nub of the matter. The plane? It has been readied, and we troop out to climb aboard. It will take into its cabin the full Pullman load of passengers; that is to say, twenty-two. (I speak here of what we shall, in the beginning, consider standard planes, although service will have to be opened with the smaller Ford planes, as the others will not be ready.) In passing, it may surprise you, if you have thought of airplanes in terms of the two-seaters of cow-pasture jitney rides, that no less than forty-eight closed models now are made in the United States; thirty-four of these models carry five or more passengers, and at least five companies will build for you a plane of the size of the one before us—if you have the price. The price, however, would be ninety thousand to a hundred thousand dollars, fully equipped.

The giant will be able to pick up three tons and speed 125 miles an hour. Big as it is, it will travel about four miles to the gallon of gas. It will carry about a ton of fuel. When we have clambered aboard and stowed away our luggage the ship will weigh a good fifteen thousand pounds.

The wing spread is more than ninety feet; that is to say, three of them, wing tip to wing tip, would give an approximate total width of one city block. When the first plane of this size was built, as a bomber for the Army, there was no hangar big enough to house it; though staked down, it was blown away in a storm one night and wrecked. There are few hangars even now capable of housing and servicing such mammoths. The length is about seventy feet, the height about fourteen, the passengers' cabin approximately six by six by twenty feet.

What we call the "live load" works out about as follows: Twenty-two passengers, at an average of one hundred and sixty pounds each; thirty pounds of luggage carried free; an additional thirty pounds permitted at a charge; two pilots and a young man who is known as "the cabin boy." The poundage of all this is around five thousand, or two and a half tons.

As we enter we discover that here also there are signs of a revolution in the decorative phases of aviation—which, in truth, were non-existent before. The cabin is carpeted, curtained, has colored wall coverings and deep, comfortable chairs. The world below is viewed from very wide windows of non-breakable glass, such as is used in the most expensive automobiles.

Ventilation is from above; the engines—three of them—are muffled, the cabin is sound-proofed; we can talk to one another in our ordinary tones. There is in fact less noise than is observable in a railway train; but it is a rather more insistent noise, because it is an unceasing hum.

The two pilots are forward in a separate cabin. We do not want you to talk to them. Moreover, they do not want to be talked to; candor compels the admission that pilots aren't very good conversationists. They



Fairchild Aerial Survey, Inc.

The airport at Columbus, Ohio, where the first lap by air of the air-rail journey across the continent will start

could not, anyway, answer all the questions a landsman usually wants to ask; and it is not right that we should make them information-bureau men. After all, they are front-rankers of a new profession, highly skilled experts, whose incomes, incidentally, vary from seven to nine thousand dollars a year, depending on distance flown.

You may, however, do this: you may walk forward and watch these men at work driving you through the air at one hundred miles an hour. Through glass you may inspect the intricate instrument board and note that the "bus" is guided, as is an automobile, with a steering wheel.

One gadget there before you will tell you the altitude. You are able to translate height into a new kind of safety term when you consider that the plane, with engines shut off, glides about seven feet for every foot of altitude lost, if you want that sort of coasting. In other words, shut off the engines while one thousand feet in air, and you have a choice of landing fields over an area almost a mile and a half in radius.

Among other instruments visible are a magnetic compass and an earth inductor compass—the latter being an instrument very useful to Colonel Lindbergh in charting his transatlantic course.

From your deep, comfortable, leather-cushioned seat—adjustable to a reclining position if you desire—press a button at your elbow for the cabin boy. He is there not only to serve you but to entertain you. He knows all about the plane, the engine, the route; and it is his job to satisfy your curiosity and relieve the tedium of a long journey by volunteering interesting information about the passing scene far below. If you are addicted to air-sickness, he is even prepared to cope with that, by giving you a simple remedy which leaves your nerves at peace and your stomach untroubled.

The pilot at the stick, forward, will do six to eight hours' flying today and tomorrow, and on the third day will lay off, so that there will be no danger of fatigue. The second, or reserve pilot, tends the radio when not at the controls. Each receives a flat salary, plus a mileage rate, with a third figure added for night flying.

The radio equipment has taken rather more than the space of one passenger, and it is expensive. It is, in short, a two-way system, difficult to procure because of certain technical obstacles. In the overcoming of these Commander Hunsaker, designer of the Shenandoah, was called in by Colonel Lindbergh. But the result is just this: A business man can travel in this plane and be much less out of touch with his business than on an express train racing across the country below us. If the need were urgent enough, he could be in almost constant contact with his office, with the stock exchange, with London even.

In Touch with the Weather Service

The radio set is there for safety, for guidance, and for the convenience of passengers.

This is the problem set for Colonel Lindbergh, Colonel Henderson and myself, as members of the technical committee, by C. M. Keys, president of Transcontinental Air

Transport: So plan an air route that pilots know their routes so well that they never will get lost; fly planes with multiple engines, so there need never be a forced landing caused by engine trouble; use two pilots, so that there is one available in any emergency; establish such a complete weather service and such continuous communication between ground stations and the plane that the pilot at all times knows weather conditions for one hundred miles in each direction and need never run into storm or fog.

"Then," our president said, "the carrying of passengers can be done safely, on schedule; the public will learn to like, to

Weather Man, as if he made the weather; what we mean, I suppose, is that he cannot tell us exactly what is coming. We should have less and less cause for this; the demands of aviation are forcing the Weather Man to keep the weather, even to miles-high phenomena, under constant observation. He is therefore going to be able to tell us a lot more about the weather round the corner, even if he cannot control it as desired on picnic days and the Fourth of July.

But let us get back to our trip. We leave Columbus at 8:20. A little later the nose of the giant will point gently downward over fields greened by young wheat and we shall have an opportunity of stretching our legs on an Indianapolis airport. Our station here will be smaller, but on the same general plan as the one at Columbus. A passenger or two leave, a new one or two join the party. The stop is for fifteen minutes.

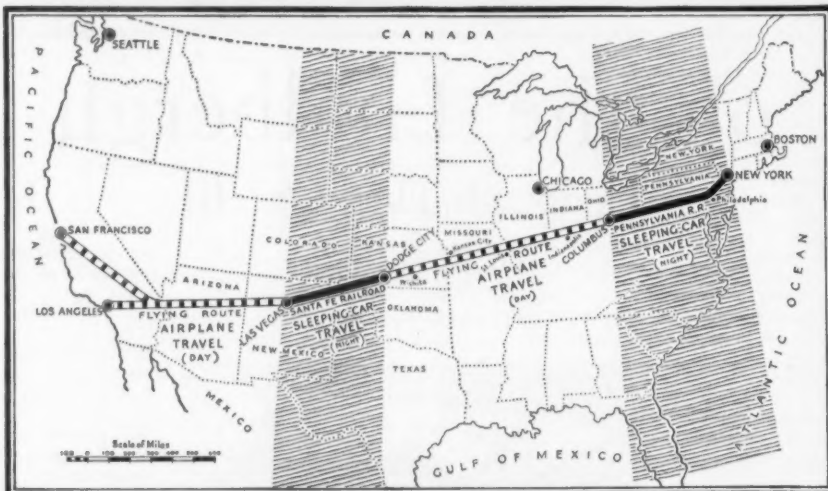
When this article was in preparation it had not been decided whether our planes would stop at Colonel Lindbergh's own home field in St. Louis. But because it is his home field, and because of its advanced design, Lambert Field, in St. Louis, deserves notice here.

Lindbergh emerged from his "private life" some months ago to speak for the passage of a \$2,000,000 city bond issue for the purchase and enlargement of Lambert Field. Then he used his influence to have the runways so planned that even the giants of the future—such as are not yet even put down on blueprints—would be able to land safely in wind from any direction. This means four wide, smooth, solid runways, each almost a full mile in length. Here also will be found a new type of union station for air lines. There is, incidentally, already a union ticket office for the air, in Chicago.

At this St. Louis field, instead of embarking and debarking passengers and luggage more or less in mid-field, occasionally in inclement weather, and usually on sod that is a trial to the high heels of women passengers, incoming planes will land on the runways and taxi in under cover. Between two buildings devoted to field administration and the care of passengers is an arched roof, like a train shed, over a concrete pavement two hundred feet wide. Here as passengers have luncheon they may look out upon preparations for departures for Chicago or for Atlanta. "Bud" Gurney, Lindbergh's companion on a barnstorming trip years ago, has succeeded him as chief pilot of the St. Louis-Chicago line, which now carries passengers as well as mail.

Our St. Louis luncheon stop is a half-hour long. At 12:38 we are off again, for Kansas City, where we get fifteen minutes in which to feel the earth under our feet.

Tuesday evening we arrive at Dodge City, Kan., once a colorful frontier town; and here we have a choice of getting aboard a Santa Fe sleeper or of turning pioneer in a new element—by taking an "air sleeper," which



The air-rail route across the country, drawn for The Companion from information supplied by the Pennsylvania Railroad

prefer, flying, and passenger transport by air will grow rapidly." Such are the objectives of T. A. T.

Here, you will see, is the place where the meteorologist enters the picture. The U. S. Weather Bureau is increasing its service; the Guggenheim Foundation for the Promotion of Aeronautics has many men studying the problem; and we learn how to collect and transmit weather reports so that the co-pilot, at the radio receiver, may receive and call out to the pilot the weather bulletins from the meteorological officers in our stations located at two-hundred-mile intervals across the country. Nothing like this has ever been done; there has been no need for it.

We have had a habit of venting our anger on the



Courtesy of the Pennsylvania Railroad

The first plane to make the regular flight between the Twin Cities and Chicago, in the new service inaugurated by Northwest Airways, Inc., associated with T. A. T. and the Pennsylvania Railroad



Times-Wide World

The giant Keystone Aircraft Company's Patrician, weighing 15,000 pounds, and capable of carrying eighteen passengers and two pilots at a continuous speed of 130 miles per hour. Sleeping-berths and hot and cold water are part of the equipment

speeds forward through the night far above the historic old Santa Fe trail and the mountains.

The "air Pullman" will carry twelve slumbering passengers in berths which are convertible into seats for day travel.

This night-flying link in the cross-continent chain is in the schedule today because, after almost four months of study, Colonel Lindbergh gave his decision for it. Pilots come to prefer night flying, the winds being generally more regular and air pockets fewer; night flying is, in short, smoother. Lindbergh himself flew the night air mail, but he was slow to prescribe it for the public and did so only after repeatedly surveying the terrain.

Your night limited of the air will be well guided. At twenty-five-mile intervals there are giant revolving beacons. Every three or four miles blinker lights mark the course. In the cabin radio beacons blink their message to the pilot, colored lights telling him whether the nose of his ship is pointed toward the radio-sending station at his destination.

If we have done our sleeping above singing steel rails, we shall return to the air next morning at Las Vegas, N. M., and travel almost all day in sight of the mountains, to arrive in late afternoon at Los Angeles. If we fly by night, we shall reach Los Angeles early Wednesday morning.

And so ends the trip on the Lindbergh Line, which "shrinks the map" and makes Los Angeles forty hours distant from New York.

In Columbus, Ohio, a few weeks ago, a proud little girl named Joan McKee took a bottle of milk in her four-year-old fists and broke it over the nose of the first ship of our line. She was the daughter of the Army's chief air officer of the area. The plane, an all-metal Ford, was christened the Columbus, in honor of the city which is the eastern air terminal of the air-rail line.

But it seemed to me significant that the chance of that city's being the terminal resulted in the giving to this plane the name of the discoverer of America. I don't think that phase of it occurred to us in the beginning. One could not help wondering what Columbus would have thought of this strange bird which would span so easily the vast continent which frustrated his dream of finding a new passage to the riches of India.

Standing smilingly beside Joan was Col. Paul Henderson, who, as we have seen, won deserved fame by organizing the first transcontinental air-mail line.

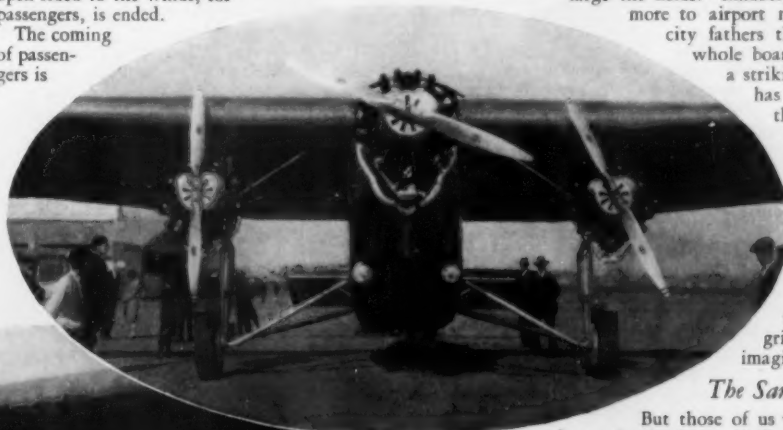
When the ceremonies were over, a man named John Collins, lately a test pilot for the Ford Company, took his place at the controls and became in his way historic also. He was the first pilot engaged by the T. A. T. This particular plane was fitted as a winged office, containing desk, typewriters and general office equipment. Behind the office there was a stateroom, with built-in berths. It started at once on a business tour; from it many final details of the cross-continent air line are being arranged.

Aviation on the Ground

It occurs to me that in the trip on which I have been taking you we have been as unconscious of the mechanical support of the system as we are of round-houses and machine-shops when we travel by train. But you will understand that these big ships of ours need as careful grooming as the finest race-horses. Our hangars, machine-shops and stock-rooms have to be of the best.

The special hangars themselves must be bigger than any ever built before, except at one or two airports. Measuring 200 feet by 115, still they will house but two of our giants. Constructed of poured concrete and of steel, they also are designed for beauty. The day of rude, ugly sheds for planes and of mere roofed shelters, open-sided to the winds, for passengers, is ended.

The coming of passengers is



The Same Lindbergh

But those of us who know him well know that he is essentially the same Lindbergh, for all his responsibilities and the necessity he has had of schooling himself to meet the diplomatic requirements of public situations.

Not long ago several of us were sitting around a table in a private room in a Los Angeles hotel. Someone had sent Colonel Lindbergh a gigantic basket of fruit, which sat in the middle of the table. He reached over to pick up an apple, and with a quick movement tossed it across the table. Someone caught it and passed it quickly to me. I tossed it on. The game grew faster and faster.

Then Slim grabbed up the basket and some "ammunition" and, holding the basket as a shield, made war on us. We dived for shelter, behind chairs and tables. My effort at gaining the protection of a closet door he foiled.

Of course the tide had to turn. But just as we had recovered ammunition and were bent on slaughtering Slim whipped through the door and into the outer hall. We waited, poised. The door opened slowly, as if cautiously. Luckily we held our fire. It was a waiter with a trayful of things. The Colonel was leaning over a stair-rail, watching for an expected debacle.

And that also is Colonel Lindbergh, after whom the first transcontinental air line is being called.

Above, the motors of the Ford monoplane, characteristic of modern aeronautic design. Left, Colonel Henderson (second from right) with officials of the T. A. T., standing in front of the new plane which is to be Colonel Lindbergh's "flying office"

going to cause airports to grow up rapidly, in efficiency, in appearance. All the phases of their management will require the services of constantly larger staffs. It is an axiom that less than a tenth of avia-



Aboard the Enemy

By Fitzhugh Green

ILLUSTRATED BY COURTNEY ALLEN



"Come back," ordered Von Grahl when Jim started up the nearest hilltop. "I am a most excellently accurate shot."

woolen curtain between the captor and her prize, now out of sight.

JIM DALE didn't want to die. "Tough," he said aloud. "A tough break." He said the words slowly and apparently without feeling. But had it not been in the darkness of midnight his knuckles would have showed white as he gripped the bridge rail by which he stood.

A strange predicament it was: a young American naval officer to be standing there on the bridge of a German raider. The raider quivered with the straining of her engines. She was fleeing. A thousand yards behind her a British light cruiser sped in pursuit.

Not so strange, however, when one knew that Lieut. James Dale, U. S. Navy, had originally been appointed to Annapolis from Texas. And it was characteristic of the grim Texan ranger who had been his father that Jim now, in the face of certain death, only drawled again:

"Gee, what a tough break for a fellow to get!"

An accurate statement, too, in the light of swift events leading up to the moment. For it was early December, 1917. America had declared war the previous spring. But America was not ready. Ships and men took months to build and equip. So a few picked American officers had been sent ahead to Europe to get experience.

Jim had been among these lucky few. To the envy of his messmates in the fleet at home, he had been hurried across for a few months with the British Grand Fleet. At once the Admiralty had assigned him to special temporary duty with the British light cruiser *Infallible*. Ten days of patrol in the bleak North Sea, on the storm-swept lane between Scotland and Iceland had preceded this tragic night.

Late in the evening watch the German raider had been sighted. Sparks from her smokepipe revealed her sinister presence to the watchful lookout. She was bound for the North Atlantic to prey on Allied shipping.

A shot across the raider's bow—two more shots, one of which clattered through her mainmast, had hove her to. A capture! Jim Dale secretly glowed at the luck of it. What a yarn to spin to the gang back home.

"If you wish," the English skipper had said when Jim asked to join the boarding party—an officer and twelve men for a prize crew.

And then the flurry of snow just after they had boarded the raider; not much snow, but enough to fall like a

SHARP orders in German filled the bridge. It would have been madness for the boarding party to have resisted: two hundred, at least, comprised the raider's crew. Bells jangled through her engine-room hatch. From stem to stern the fast pirate trembled as steam swung her blades through the black water. She gathered way. At full speed she lurched upon a new course to throw her captor off.

And then the snow flurry passed. Instantly the British cruiser broke out her searchlight. She was fast, but she could not gain. Her skipper had two choices: he could lose the stern chase, or he could open fire and sink the raider. If he lost the chase, the raider would cruise the open sea, sinking traffic and drowning men—a multitude of men if she fell in with a troopship. If he fired and sank her, he must sink his own boarding party with her.

Though Jim Dale spoke slowly, he had a mind that moved fast. Even before the searchlight had bored a white tunnel through the night he had seen the inevitable: the only sensible thing for the English skipper to do was to open fire and sink the raider with his boarding party aboard!

A yellow flame spurted through the searchlight's beam. The next instant a strange whining sound passed to starboard, ending in a soft *whish-b-b* somewhere ahead as a projectile landed in the sea.

Jim felt a sharp yank at his elbow. Because it was sensible to take shelter, he followed the hand that gripped him. On the forecabin deck and in lee of the upperworks he was pushed toward a heavy figure that suddenly loomed before him in the lurid glare of the reflected searchlight.

"You are an American?" a deep hoarse voice asked him sharply. Jim turned and saw that he was standing before the German officer who commanded the raider. Von Grahl, someone had said his name was; and a commander, by the stripes that showed on his uniform.

"Yes," said Jim, drawing even the single word as if he had been asked about the weather or the price of cheese.

"Then you will go with me."

"How's that?" asked Jim a little impertinently.

For the moment the German's heavy features, more deeply lined by the bursts of flame above them, seemed contorted by anger. But presently he spoke again more arrogantly: "You will go in the boat with me." He

waved a hand at his suffering ship. "They will sink her in ten minutes. We shall let her go. Her boilers are not so good. Her men will be picked up."

Abruptly the glare of the searchlight dimmed. It was another flurry of snow. The terrible crash of striking projectiles ceased. A few sang overhead. Then the cannonading astern was silent.

Jim could feel the vessel heel as her helm was put hard over. Her lights were still all doused, but a yellow flicker aft showed where she was on fire in several places.

Von Grahl shouted an order to the bridge and then stepped to the port rail where a small boat hung from low davits. He motioned Jim to follow him. Because two men gently but firmly urged him on, he obeyed.

The boat splashed into the water and automatically unhooked from its falls. Two men manned its oars and, at a word from Von Grahl in the stern sheets, gave way together. In a few moments the raider's high bulk vanished in the blackness. Von Grahl flashed a tiny pocket flare at a boat compass between his feet. Almost at the same moment a glimmer lit the night astern and the pound of naval artillery was renewed.

"Haw," chuckled Von Grahl aloud. "They will surrender now, if necessary. But my business goes on. Do you understand, Mister American?"

"No," drawled Jim through the darkness. Yet he had an inkling: for the first time he noticed that the German commander held in his lap a bulky flattish bag that resembled a brief-case full of documents.

ON the second morning, helped by oars and a small sail the boat made a low rocky promontory on what Jim took to be the northwest corner of Ireland. No ships had been sighted on the uneventful voyage. This was largely due to the detached masses of raw fog that enveloped them from time to time. There had been little conversation. The oarsmen were dullards of the gun deck, and Von Grahl seemed overcome by a ponderous preoccupation.

But when the big German officer stepped ashore he quickly brightened up. So did Jim. This was Ireland; Ireland was England; and England was a friend. He had but to walk to the nearest settlement; and in a few days he would be out of this crazy mess.

"Come back," ordered Von Grahl when Jim started up the nearest hilltop for a look about the country. "I am a most excellently accurate shot."

Slowly and with real surprise Jim sauntered back until he was face to face with the German. He stood so close that the other had to glance up slightly in order to look into his narrowed eyes. Jim rocked ever so lightly on his heels and then drawled:

"You mean to say you think you've hooked on to me for good?"

It was the German's turn to look surprised.

"Hooked on? What is? Oh, yes, you hook on a

boat." He smiled. "I see. Yes, Mister American, you are my prisoner." He spread out his hands. "But it is not bad. You are my friendly prisoner. I must talk with you and learn things about America. Of course—" His thick hand descended again to the pistol butt.

"I get you," said Jim quietly. "But suppose I don't want to be a prisoner?"

Von Grahl shrugged his heavy shoulders and, turning to the two seamen, made a short remark in German. Both laughed and stared with round shining eyes at Jim. Apparently they had heard that Americans were queer people. This one their officer had captured was no exception.

The laughter relaxed the tension of the moment. And it gave Jim the chance he wanted. Quickly placing one hand on Von Grahl's chest, he pushed as hard as he could. The other hand he rolled into a ball and brought with all the force of his good right shoulder up under the chin of his captor. Then he turned and ran lightly up the rocks and disappeared from view over the skyline.

There was no pursuit. It wouldn't have done much good if there had been. Jim Dale's record in the mile, the half and the quarter still stood unbroken at Annapolis. As he expected, he came upon what appeared to be a small white farmhouse not a mile from where he had left the three Germans. There wasn't any farm, but there were a few cattle. And a man was working in a sort of stable yard in front of the house.

"What's the road to the nearest village?" shouted Jim. The man, a bent old fellow with a face like leather, cupped his ear and leaned toward the stranger.

Jim repeated his question, shouting loud enough for the deafest man in the world to *feel*, even if he couldn't hear. But the only reply he got was for the old man to motion him toward the house, the door of which was open. With a glance over his shoulder to make sure the Germans were not yet in pursuit, Jim stepped in. As he did so the door closed behind him and the old man, who had quietly followed him, slipped the latch.

"Here!" snapped Jim. "No funny business. Open that door."

An evil grin overspread the old man's weather-beaten countenance, and he nodded over Jim's shoulder.

Jim turned and found himself face to face with a stocky lad in the uniform of a chief petty officer of the

German navy. The fellow held a revolver lightly in his hand but wore a pleasant grin of hospitality.

"*Sprechen Sie Deutsch?*"

"Shucks," observed Jim and seated himself on a rough bench near the fireplace.

Von Grahl arrived in about ten minutes. His face was not only bleeding from a cut on one cheek but was purplish with anger and from the exertion of walking rapidly up the hill. Giving a glance of hatred at Jim, he spoke rapidly to the petty officer when he entered. Then he turned to his prisoner.

"So the English speak the truth of you Americans," he sneered.

"Humph?" grunted Jim quizzically.

"They say you have no manners," said Von Grahl between his teeth, getting a grip on himself only by an effort.

"They also say you people have no sense," retorted Jim pleasantly. "And it does seem foolish to behave this way."

Ignoring the insult, Von Grahl swung about to the bulging leather case which one of the oarsmen had brought from the small boat. Nodding toward it, he said with a sudden show of pride: "Perhaps, when one does not know what transpires."

Jim shrugged his shoulders nonchalantly.

"How many men does America send to Europe?" Von Grahl flung the question abruptly as if to surprise his captive.

"Oh, about ten million this year; more next," said Jim without batting an eye.

Von Grahl stared. But Jim's face was as expressionless as a flat pine board. Then he asked: "Is she sending some destroyers?"

"Oh, a few. Maybe two hundred. Just the slower ones this winter. A couple of hundred more will be ready in the spring. Good fast ones." The exaggerations dripped from Jim's tongue like butter from a hot knife.

"How fast?"

Jim wiggled the fingers of his right hand as if counting. "Forty-five knots," he lied easily.

An excited interchange passed between Von Grahl and the petty officer. Then the former went on: "And there's plenty of money?"

"Money," giggled Jim; "why, man, there's more money than we know what to do with." He leaned over and spoke confidentially: "Honest to goodness, Commander, we've been wondering for years what to do with the extra cash we have on hand in America. But now this war's come on, and it's just what we want!"

This time Von Grahl had the petty officer seat himself at the table and take notes with pencil and paper, but not before he gave Jim a searching look of deep suspicion.

JUST then one of the seamen who had been standing by the window detached himself and, saluting, made a sharp military report. Instantly all present except Jim sprang to the casement and stared out. What they saw seemed to please and excite them enormously.

"Now we go again," announced Von Grahl. "Look." He turned to Jim and pointed through the window.

In a small cove below and on the other side of the promontory on which they had first landed lay a submarine. Her sides were streaming water as if she had just emerged from the sea. It was unmistakably a German U-boat.

To his inner dismay Jim knew now what was up, and why. This was one of the secret German submarine bases on the isolated north Irish coast about which he had heard so many wild rumors. And Von Grahl's mission was to carry important information to the U-boats rather than to act the pirate in a North Atlantic raider.

What a bold scheme it was! And how terribly effective! For it was easy to fuel a submarine and to feed her men from the prizes she took. Only facts about the enemy were the one vital need. And Von Grahl must have them in his bulging brief-case.

Then and there Jim determined to destroy the case and its contents, if it cost him his life.

The early dusk of high latitudes was just settling over the desolate coastline when Jim clambered down the U-boat's main hatch and heard the water-tight steel cover clamp down above his head. Not for one single second had Von Grahl permitted him to be alone that afternoon; nor had a single loophole for a dash to safety presented itself.

Besides, Jim now felt grimly that it was his duty to stick with his captor to the end. He might have a chance to

[CONTINUED ON PAGE 111]



Simultaneously and at almost point-blank range, the guns of the Mystery Ship opened fire. The water around the U-boat boiled and geysered with the shells that sprinkled about her



"Would you rather be a farmer than do newspaper work?" Joan demanded critically. "Or surgery, or diplomacy?"

Tony Hazard Climbs the Wall

By Margaret Ward

ILLUSTRATED BY D. S. WENDELL

OH, Joan Jordan, can you come for a hike? I've got something to talk about—something special. Right now. Oh, thanks a lot!

Joan hustled into her wind-breaker and overshoes, for it was Ann Hazard who had phoned her, and when Ann said hike she didn't mean a stroll. They'd go up the Notch road maybe; Joan had wanted all the week to climb up into the hills among the snow-capped evergreens.

The Hazards lived three doors down from the Jordans, in a beautiful old house full of books and pictures and cabinets of curios from all over the world, and cared for by a corps of efficient servants, but all the same not half so homy and attractive, Joan thought, as Deepdene.

Mr. Hazard was a lawyer. All his cases seemed to be in New York or Washington or Chicago, so he was almost never in Hillsboro. Joan admired him from a distance and loved Ann, who was two and a half years her senior. And she was fond of Tony. So was everybody in Hillsboro. Tony had his father's fine mind and his mother's strong love of the country and all outdoor things. But his warm friendliness was his own, and so was his originality and likewise his propensity for getting into awful scrapes.

Ann was watching for Joan from a front window and came hurrying out to join her. She was usually a very placid, well-poised person, as she needed to be, now that she managed her father's big house, looked after her frail little mother's comfort, and generally "ran things" for the Hazard family. But today something had certainly ruffled her.

"Ann," laughed Joan, "you've got a gray fuzzy glove and a tan leather—"

"Oh, I know it!" returned Ann. "Who cares? We'll go right out into the woods, shan't we? Joan, the worst thing has happened. Tony ran away from school!"

"Tony—ran—away!" gasped Joan. "Where'd he run to, and why?"

Ann sighed deeply. "He wanted to leave at Christmas and go to work, but of course Dad wouldn't listen

to it. Oh, it was just horrid at home then, Joan—so much discussion, Father raging, and Tony sulking, and Mother quite used up over all the trouble between them. When Tony went back he stayed just a week and then disappeared—went to work in a mill near Boston. Dad got detectives on his trail, and when they found him I wrote him that we hadn't told Mother and didn't dare to, and I just begged him to come home. He's coming tomorrow, and then, Joan, it's up to you."

"Up to—me?" repeated Joan blankly.

"Why, yes, to fix it," explained Ann impatiently. "Dad wanted you to take a bigger contingent fee—that means he pays you a lot if you get Tony back to school and nothing otherwise—and a bonus—that's an extra—for any time under three months that he's out. But you're not to think anything about that, Joan, because I'll see that you get the nine dollars a week anyhow, and besides I'm sure you can succeed. Of course you can, because you've just got to!"

Joan stopped stock-still in the snowy road and stared hard at Ann Hazard. "You mean," she said, "that you want me to be Miss Fix-It to Tony? Why, Ann Hazard, how ridiculous! What can I do when you and your father, the smartest man in Hillsboro, and I guess as smart as any in the United States, can't manage him?"

"Wait a minute," interposed Ann. "It's to be confidential, of course, just as you advertised. Naturally Tony's not to know, nor anyone else but Dad and me. And as for Dad's being so smart, I'll just tell you that it took very little arguing on my part to convince him that you were our only hope. Now that's a judgment you ought to value." Ann paused and looked at Joan, who only stared back stonily. Then Ann launched her final argument. "You know, Joan, it was you who stirred Tony up to all this foolishness, so it's really sort of up

to you to make him see that Dad will very soon need him in his office and is going to be broken-hearted if he won't give the law at least a try."

"Ann," said Joan in a scared little voice, "what did I ever say to Tony to make him run away from school?"

"Oh, it was nothing you said," explained Ann impatiently. "But the idea of Miss Fix-It fascinated him, and the Wrennann Wreaths fascinated him. He kept talking about you to Dad, and Dad kept saying, 'Have you thought of any new and important career for yourself, as Joan has?' And then Tony'd rage: 'How can I think of anything important in a big dorm?' And then I was idiot enough to send him the Herald with the gibel story in it, and off he went!"

Joan sighed. "I'm awfully, awfully sorry. I'll talk to him right away and explain all the differences between us, and try to make him see sense. I'll do my best, but I can't take pay—"

"See here, business is business," declared Ann with decision. "I'm betting on you to do this job and do it quick enough to earn Dad's bonus. Now let's talk about something pleasant and climb to the top of the Notch."

NEXT day Tony arrived on the two-ten train, and before supper he was over, demanding of Joan a complete and detailed account of Miss Fix-It and Wrennann Wreaths. Joan gave it, being quite frank about the discouragements that she had hitherto kept strictly to herself.

"You see, Tony, it's meant a lot of hard work, and the profits aren't enough to boast about yet. And, Tony, you know I only did it because I had to. I wanted most awfully to go to Harding, but just now it couldn't be managed. Some day, perhaps, when—"

"Beastly shame, Jo!" agreed Tony. "College is a great lark, I don't doubt, but I want to live. I've had enough of being taken care of and paid for and planned for. I tell you, Jo, a rich man's son hasn't a chance nowadays. Work's the thing!"

"Um!" Joan considered that. "What you going to do, Tony?"

Tony wriggled uncomfortably. "I know what I'm not going to do: Latin prose and Trig and Ancient History. I didn't mind English, but all the rest of that college prep stuff is about as useful as—as a party dress to a chicken. Speaking of chickens, Jo, I had sort of thought of having a chicken farm. You see, Dad's letting me off school without a row on condition that I stick around here near Mother for a while, and farming is about all a fellow can do here in Hillsboro. Besides, I believe I'd like farming. It's work, and work that really counts, and there's plenty of room at the top."

Joan looked at Tony, slim and lithe, well-groomed and white-handed.

"Would you rather be a farmer than do newspaper work?" she demanded critically. "Or surgery, or diplomacy? How about that unbreakable, unsinkable airship you were always going to invent?"

"Oh, I may do that yet," said Tony airily. "A farmer has lots of time to think, and to work on sidelines in winter. As for the other things, they're not productive. A surgeon patches people up; reporters and diplomats are just so much deadwood. I'd prefer to feed well people to patching cripples or to almost anything I can think of. It's sort-of—elemental."

Joan had listened with interest. Now she bestowed upon him her nicest smile. "It's splendid to be daring," she said, "and—and elemental, and all that. I think running a chicken farm would be just great. Chickens are such a necessary food, specially for company. And now, Tony, I'm sorry, but Miss Fix-It's on a job, and she'll have to go to it. Whatever you do for a living, Tony, I guess you'll find that work is work. It's got to be done."

"That sounds all right," said Tony, rising reluctantly. "You have a lot more sense than Sister Ann, Jo. She thinks I ought to have stayed at school."

The minute he was gone, Joan flew to the telephone and called Ann. "I've listened hard for an hour," she announced, "and I think he was just sick of studying—he admitted he had some poor marks—which is absurd for Tony,—and then he felt like bursting out and having his own way. Let him do it, and let him think he's doing it all! He'll hate it, Ann! He's too lazy and too much in a hurry for results and too—too afraid of getting his hands dirty. Hustle him into chickens and make him think he can't go back to school—not ever! Build a wall around it too high to climb, and before you know it Tony will want to climb over—because he can't. If you manage right, he'll want to go back in a lot worse way than he ever wanted to come out."

"Hustle him into chickens—build a wall around school and college—," repeated Ann calmly. "I'll tell Mother and write Dad. It sounds—all right to me. You're a great one, Joan!"

"And whenever he complains or tries to skimp work or change jobs, you just say, 'Work is work, Tony.' It is, you know, Ann—or maybe you don't know yet. Tony doesn't. He thinks work is 'the thing.'"

Ann's slow chuckle came over the phone to Joan. "Good-by. He's strolling up the front walk."

TONY HAZARD was amazed and a little upset to find himself in an astonishingly short time the owner of an acre of land, two hundred Rhode Island Red chickens,—which Tony secretly thought very ugly little creatures,—three very modern chicken houses, a big incubator, a hundred eggs to put in it, and a substantial credit at John Smith's grain store. These things, Tony had told his mother, were absolutely necessary if he was to go into business properly. When, after one brief interview with the overseer of Mr. Hazard's two big farms, she agreed to everything, Tony was a little taken aback and suggested that spring was really the best time to start farming.

"Yes," said Mrs. Hazard, who had been carefully coached by Ann, "it is. I thought you were very clever, Tony, to want to get established now, so that spring, with all its opportunities, will find you with a going concern."

"Umm—" said Tony. "Yes, I suppose I'll be going strong by spring."

One day of running his chicken farm unassisted (doing the job all himself had been in the bond) had completely disillusioned Tony. All the winters he had spent in Hillsboro, he and Ann, or sometimes he and the Blakes

or the Jordans, had gone out at least once a week to the edge of his father's woodland, trampled down the snow at a certain spot and scattered seed and grain for the pheasants with which the hills had been stocked. Tony had visualized chicken-keeping as very much like those winter tramps to feed the pheasants. Well, it wasn't! Chickens had to have this and that and the other in their rations. They had to have water. And water freezes in winter. All Tony's inventive genius, he saw, would be needed on the agonizing water problem. Moreover, the incubator directions were worse than any Trig demonstration, and with fresh eggs piling up and bidding fair soon to become Ancient History, Tony secretly sighed for the finicking distinctions of Latin prose, as far preferable to the problem of getting up his nerve to try to sell eggs in Hillsboro.

But Tony was a good sport. He assured his mother and Ann (who told Joan all about it) that his chickens were doing beautifully—except ten that got crop-bound just because for a day or two he forgot to feed them any grit. Only to Joan, as from one worker to another, did he confide a few of his annoyances and worries and perplexities.

"Oh, well, Tony, work is work," Joan would reiterate each time provokingly. "I told you—"

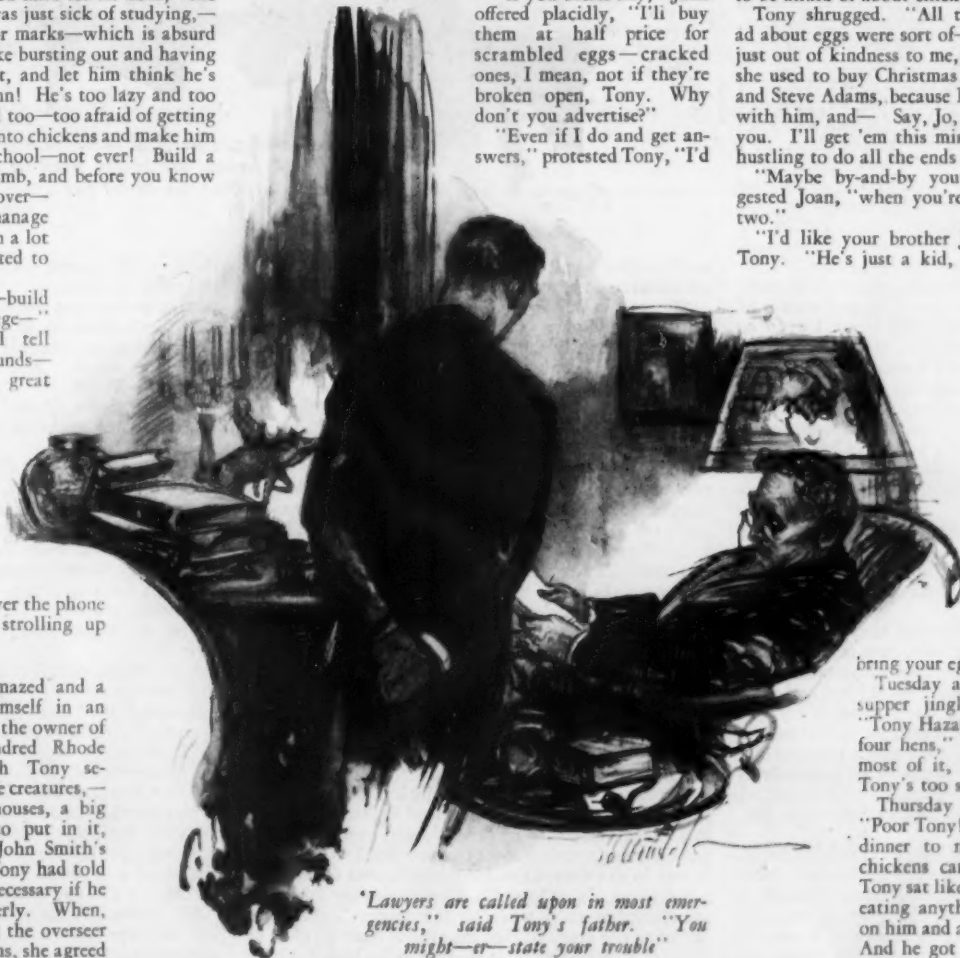
"You've told me that times enough," Tony would retort heatedly. "You sound exactly like the signs in Steve Adams's old bank, 'Save and you have it, 'Today's extravagance makes a lean tomorrow,' and all that. Those signs always annoy me, and that 'work is work' of yours is right in the same class. Tell me how I can sell eggs."

"First," began Joan solemnly, "you must have some to—"

"Those hens of mine are the champion layers of Hillsboro County," Tony informed her eagerly. "I've got eggs. I can't step without walking on 'em."

"If you break any," Joan offered placidly, "I'll buy them at half price for scrambled eggs—cracked ones, I mean, not if they're broken open, Tony. Why don't you advertise?"

"Even if I do and get answers," protested Tony, "I'd



"Lawyers are called upon in most emergencies," said Tony's father. "You might—er—state your trouble"

hate to take the money—from friends, I mean. If I didn't know everybody here—"

"Business is business," began Joan.

"Hey! There you go again with your nateful slogans!" cried Tony crossly.

Joan tried to look contrite and succeeded only in looking very charming. "I'll tell you what, Tony. If you've got too many eggs, why not sell some chickens? Sell the ones that don't lay. Well, of course that wouldn't help, but it's more customary, isn't it?"

"Naturally," snapped Tony. "But I've just bought those chickens. What's the point in selling—"

"Oh, I thought you bought them alive to kill—and pick—then to sell," said Joan innocently.

Tony glared and went home.

Next day Ann reported that Tony had come in from the chicken farm looking very white and sick, and that roast chicken for dinner (not Tony's chickens, but the regular farmer's) had produced a recurrence of his trouble.

"Do you suppose he tried to kill one of his?" asked Joan.

"That's exactly what I do suppose," said Ann. "Poor Tony! I always told him he was too tender-hearted to be a surgeon. Imagine him beheading one of his red-headed darlings!"

At the end of the third week of the chicken farm Mr. Hazard came home for Sunday, bringing Tony a voluminous encyclopedia of animal industries as a birthday present. Tony, who had hinted for a set of Conrad, thanked him politely.

Later in the day Mr. Hazard sauntered out to Tony's plant, asked a few embarrassing questions about "marketing methods" and "cost accounting," and ended by giving an order.

"I'm having three men out here Thursday for a business conference and dinner. I'd like to serve your chickens, Tony. Ann will tell you what weights she'll want and how many."

"All right, Dad. Thank you," said Tony, and whistled through dry lips as he thawed out water-pans.

IN the dusk he went to talk to Joan. "Say, Jo, before you went into the Fix-It business, did you think out what it would really be like?"

Joan smiled at him wisely. "Gracious no, Tony! If I had, I'd never have dared—"

"Same here, Jo," said Tony.

Joan tried to look astonished. "But there's nothing to be afraid of about chickens!"

Tony shrugged. "All the folks who answered my ad about eggs were sort-of—poor. Or else they ordered just out of kindness to me, like Mrs. Sticher, who said she used to buy Christmas seals of me when I was ten, and Steve Adams, because I opened my business account with him, and— Say, Jo, I've got six cracked eggs for you. I'll get 'em this minute. It sure keeps a fellow hustling to do all the ends of this job himself."

"Maybe by-and-by you can have a partner," suggested Joan, "when you're making enough to support two."

"I'd like your brother Johnny for a partner," said Tony. "He's just a kid, of course, but I think we'd get on."

"Oh, Johnny's busy in school and will be for years to come," announced Joan complacently. "He wants to take one of those business-administration courses the colleges are offering now. I suppose some day he'll be able to give you and me some expert advice on advertising and selling and the cost of accounts, if that's what your father called it."

"Well, I can't wait all those years to find out a few things," said Tony wearily. "Good-by; I'll bring your eggs right away."

Tuesday afternoon Johnny came in to supper jingling money in his pockets.

"Tony Hazard hired me to help slaughter four hens," he explained. "I had to do most of it, 'cause it is a mean job, and Tony's too squeamish."

Thursday night Ann phoned Joan. "Poor Tony! Dad insisted on his being at dinner to meet those men. When the chickens came on, Dad explained, and Tony sat like a martyred marble image, not eating anything, until Mother took pity on him and asked him to get her lorgnette. And he got his eggs mixed up somehow, and Mrs. Sticher telephoned me to complain that hers weren't fresh. Oh, and the incubator got too cold just before a lot of eggs were to hatch!"

"Poor old Tony!" said Joan. "It was mean to hurry him into buying all those things that he didn't understand. Has he mentioned school, Ann?"

"He sits for hours in the evenings reading over letters from his school pals—all urging him to come back, of course, and telling about track and baseball possibilities. When he reads out anything, I say, 'They don't talk about the stupid, difficult things like Trig and Latin prose, do they?' And Tony looks so mad! Joan, suppose Mother

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Guard's Back

By Jonathan Brooks

ILLUSTRATED BY GRATTAN CONDON

(AUTHOR'S NOTE: I feel that I should explain to the friends of Jim Byers who have been watching his progress through Jordan University, and also to any basketball fans that may happen to read this story. It was my understanding that Jim would not play basketball this year, and I did not keep in close touch with him. Therefore when the new play that is known as the "guard's back" was developed, I was not at hand to study it in detail. I asked Jim about it later, but he is too modest to tell the story as it should be told. When I asked Coach Lennox about it, he said he could neither write nor tell a story. However, Dean Warrenden, of the School of Commerce, saw the game and has given me an account of it which, in spite of the fact that he is not a basketball or sports fan, is fairly clear. I therefore offer his story and promise that in the future I shall be more careful to keep more closely in touch with Jimmy and his affairs. J. B.)

IT has been my feeling that I am trustee or steward for the Railroad Scholarship Fund presented Jordan University's School of Commerce by William Armstrong, of the Universal Metals Corporation. [This is Dean Warrenden speaking.] He gave it to us voluntarily, partly because he knew what he wanted done in railroad study, and partly because he wished to help James Byers, who now holds the scholarship, prepare for work in the transportation field. He has kept in close touch with the progress Byers is making, and so has his friend, Charles J. Allison, president of the Old Stony lines, for whom Byers works during vacations.

At the same time I have felt that I should watch Byers and guide him as well as I could, because the scholarship should be a credit not merely to Byers and to railroading, but to the university as well. This being true, I have thought that perhaps Byers devoted too much time and energy to athletics, as so many of our young men do in my opinion. I believe he agrees with me, for, although he has not been able to discontinue football and basketball, in which games he is an outstanding player, as I am informed, he has stopped playing basketball.

"I played only about two-thirds of the season last year," he said to me. "I am not big enough or good enough to be a regular member of the team. Besides, I'd like to have the basketball time for extra reading on railroads. So I think I'll not go out for basketball."

Of course I was pleased with this decision on his part, and, after recommending two good advanced studies of railroad problems for him to read and digest, I wrote to both Mr. Armstrong and Mr. Allison, advising them that Byers had decided to cut down his athletic program and devote more time to his scholarship. I was careful to tell them both that I had not influenced Byers in any way, for they are inclined to think I am an old fogey on the subject of athletics. In fact, both of them have repeatedly said that young Byers could find as much value in athletics as preparation for railroad work as in the books of our best writers.

It seems to me that they took this view because they thought the best writers were amateurs in railroading who knew little about the business. Mr. Allison went so far as to say: "Resource is more important than research in railroading."

I might have replied, at the time, that of course resourcefulness comes, in part at least, from research. One meets emergencies best when one knows how others have met other and similar emergencies; but if I had said so to Mr. Allison he probably would have said yes, if any two emergencies are alike. He believes that in railroading all emergencies are different. In any case, I wrote to him and to Mr. Armstrong, advising them that young Byers would not play basketball this year, and that I expected him to do more and better work on his scholarship. Mr. Allison replied as follows:

"It is agreeable with me for Byers to drop basketball if he wishes, but I believe he should use his own judgment. Competitive sports are fine for boys, especially if they are going into a turbulent, changing business like railroading. A good athlete knows the rules, knows his team's program, knows what to do when things are going right. And he learns, which is more important, what to do when there is no rule, no program, and things are going wrong."

"Railroading, Dean, is full of rules, regulations and routine, and our men must all know them. But it is also full to overflowing of happenings, accidents and emergencies that do not come under any of our planned arrangements. So our best men must be resourceful. That is why I like to see Byers getting athletic experience. He is naturally a resourceful chap, and varsity games help develop him along this line."

What he said, of course, is true, and I appreciated the broad view he took of the situation. But Mr. Armstrong,



"By all means, Byers," I said. "Let's not let old Jordan fall behind when we could help keep her to the fore!"

on the other hand, who gave us the fund, wrote me a rather sarcastic letter.

"Dear Dean Warrenden," he wrote, "I have your letter of the 6th and note what you have to say about Byers' dropping out of basketball. That is all right with me, especially if, as you say, it was his own decision. I think he will get all the railroad studying done that he can, and feel sure he will do justice to the scholarship. If I had not thought so, I should not have presented the fund and suggested him as the first holder of the scholarship."

"However, while on the subject of athletics, which you mention, why do you not take a little more interest in sports? I should think you would find it easier to interest the boys in your stuff if you took an interest in the things that stir them up. Why not go to see a game, now and then? Did you ever watch young Byers in a game? Or my son, Bill? Or their chum, young Moore? If you did, you would understand how they feel about games, and why Allison and I are glad to have them competing on the varsity teams."

Now, I might have felt somewhat offended at this letter, but I could not quarrel with such a good friend of the university as Mr. Armstrong, and besides he might be right. Perhaps I have taken too small an interest in sports. After re-reading his letter, I thought a long time and finally decided he was right.

The last occasion on which I really became enthusiastic over athletics was when I was a student, an undergraduate, at the University of Pennsylvania, years and years ago. I am ashamed to count them up, but I will say that it was in the days when Penn was famous for the old guard's-back play in football. We were playing Columbia, as I remember, and it was a bitter struggle. The balance hung first one way and then the other. Near the close of the contest, with Columbia slightly in the lead, our boys obtained the ball and started marching down the field with it—a yard, two yards, eight inches, at a time. Near the goal, Columbia braced, and for two downs stopped our eleven completely. And then on third down we played the guard's back; they made an irresistible interference, and our eleven swept over their goal for the winning score! I became so enthused that I threw my cap into the air!

ON recollecting this incident, after reading Mr. Armstrong's letter, I felt somewhat the same thrill that stirred me the day of the contest. I reflected that, if such men as Armstrong and Allison thought it was good business for boys to strive in

athletics, perhaps it was good pedagogy, or teaching science, for professors like myself to take an interest in it. I therefore resolved to pay some attention to athletics, from now on.

"Byers, it is almost time for baseball again," I said to him the next time I encountered him. "How do prospects appear? And how is our young friend Armstrong getting on?"

"Rotten," he said, looking at me in some surprise. He could not understand, I suppose, why I should be interested at all. "I mean, baseball is away off, yet. Armstrong is rotten—he's twisted his knee and pulled a tendon in his side."

"Now, that's unfortunate," I replied.

"Yes, especially with Morgan out with the measles," said Byers, looking glum.

"My word, what will we do?" I asked.

"Well, I don't know," he said. "Coach asked me to come out, but I told him I'd promised you I wouldn't, and besides basketball is almost over. They ought to get through, some way."

"Why, Byers, if they need you, I should

think you'd go out," I said, although my heart was not really in the advice. I hated to see him cut down the time he was putting into the research work.

"Do you think so, Dean?" he asked, eagerly. "I've run ahead of my schedule on that reading you gave me to do," he added. "And if I get behind, I can catch up again, easy."

"By all means, Byers," I said. "Let's not let old Jordan fall behind, when we could help keep her to the fore!"

If the boy thought at all, he must have thought I was losing my mind! Indeed, I may admit that I feared so myself, for the words were certainly strange, coming from me. But he evidently did not stop to think. In fact, he fairly ran away from me. I suppose that it was time for the varsity team to practice, and he must have been in a hurry to report to the coach. I wrote to Mr. Armstrong and Mr. Allison advising them of the emergency, and saying that young Byers had gone out to meet it.

Two or three days later I again chanced to meet Byers, just before a class to which I lecture, and I stopped to talk with him. I asked him how things were getting on, upon the basketball court.

"Looking up, sir," he replied. "Coach has thrown me in at forward, in Billy's place. He's still laid up, and so is Morgan. My wind is short, but I'll be all right in time for the Putnam game, next Saturday night."

"Well, well, that's splendid, splendid," I said. Having gone into this program, I was determined to seem as encouraging as possible. Again, however, young Byers looked at me with a rather startled air.

Mr. Allison did not bother to acknowledge my letter, but Mr. Armstrong sent me a telegram, which rather puzzled me. "Bill will be all right, and Byers will meet emergency and whip it," he telegraphed. "Suggest you get in behind him and root at next game."

I saw no reason why he should telegraph me, although I know a good many business men use the wires instead of the mails for short messages even if there is no occasion for haste. I understood the word root, which means to cheer, but I could not comprehend his meaning when he said for me to get in behind the boy. The place of a professor is out in front, as a guide, or leader. However, I resolved to take him at his word and inquired of Byers when the next game would be.

"We play Putnam Saturday night, Dean," he said. "Had you forgotten?"

"Er, I suppose I did," I replied. "But I'm coming to the game."

"Fine," he exclaimed, in amazement. "That will be great. We leave at noon."

"Leave?" I echoed.

"Yes, the game's at Castleton," he said, "and it will be a peach. They licked our team, early in the season, but we're going to try to whip them this time. You'll see an old he-battle, sir," he concluded.

I could see that the shock I gave him by stating I would attend the contest was at least equal to the shock he gave me when he said the contest was to be held at Castleton. However, we both survived, and I determined to stand by my word and go to the game, although I shall admit that Mrs. Warrenden looked at me, when I told her of my intention, as if she thought I must be getting childish in my old age. She was totally unprepared for such an announcement on my part. But I did not let that deter me. I was determined now not merely to display an interest in the doings of my boys outside the classroom but to see for myself whether such a boy as young Byers, for example, really demonstrated his resourcefulness in a basketball struggle—such resourcefulness, for instance, as would be helpful to him in the railroad business in his later life.

FOR fear that some of my older colleagues, as old-fogyish as myself, might rally me on my decision, I said nothing about it to any of them, but on Saturday I took myself down to the noon train and boarded it for Castleton. I would enjoy a light half-holiday with the boys in their rough and possibly roughneck ways. To my utter surprise, I found, among the boys looking at magazines and playing a game of cards to while away the four hours of riding to Castleton, that Byers was reading one of his railroading books, and the coach was also reading.

"Dean Warrenden," said Byers, getting up from his seat, "let me introduce Mr. Lennox, our coach. Coach Lennox, this is Dean Warrenden."

"Ah, Coach," I said to this pleasant-looking young fellow, whom I had not known, "a little light reading, to pass the time? Do not let me interrupt you."

"Well, yes, it is light," he laughed. "Some of Homer's songs, in the original Greek. Boning up for my Master's degree, sir. Won't you sit down?"

Can you imagine my amazement? These animal-like young fellows—the original Greek—But then, that is not my story. If I evince surprise, from time to time, at new revelations among these young fellows, you will please overlook it. And of course I suppose the boys were just as much amazed at my sudden interest in them and their doings as I was upon finding them lively, keen and high-minded chaps. They were far different from the athlete as he has often been described to me by some of my sour colleagues, who picture him as a fellow with low brow, lower intelligence and no moral sense. Byers,

I should say, is fairly typical of them, and another boy somewhat like him is planning to apply for a Rhodes scholarship in the hope of getting to Oxford. We had a most enjoyable conversation on the train. I told them, I remember, of that great game between Penn and Columbia when the guards-back play won the day. They seemed to be interested, especially Byers and Moore, who are football players. Byers, indeed, is captain of the eleven for next fall.

It had been my intention, upon reaching Castleton, to communicate with one or two of my friends on the faculty of the college and spend the time intervening until the contest with them. But upon leaving the train, Coach Lennox and the boys fairly kidnaped me. I went, perforce, to dinner and then to the game with them. In fact, Coach Lennox kept me with him constantly, first in the dressing-room and then on the bench beside the playing-floor. In the dressing-room, before we went out to the gymnasium floor, he turned to me and said:

"Dean, have you anything to say to the boys before we go out?"

"Only, and I'm grateful to you for the opportunity to say it," I replied, entirely missing the point of his question, "that I have had a most enjoyable trip and am delighted to find our team is such a fine group of young men."

"No, no," he said, quickly, repressing a smile. "I mean, about the game."

"Oh, of course, the game," I said, feeling an intense awkwardness at having said such an asinine thing a moment before. "Why, I fully expect you boys to rise and defeat Putnam, decisively. You can do it, just as Penn, with the old guards-back play, defeated Columbia!" I tried to put some spirit into my words, to inspire the boys. This, I see now, was the purpose of Coach Lennox in calling upon me. And I must have succeeded, because they all laughed, and patted each other on the back and said, "Thatta boy, Dean."

"We use our guards forward," said Lennox, smiling, when the excitement had subsided. "You, Moore, and you, Mayfield, must get down the floor with the ball. If we lose it, back you go, Moore, on the run. Guards back, for you! Remember!"

"Yes, sir," Moore replied.

"All right, then, heads up, everybody. Let's get out and warm up."

With that command, we went out to the gymnasium floor, and I have not been so utterly bewildered in years. The playing-floor was in the center of a great rectangular room, with solid walls of people rising up on bleacher seats from the sides and ends of the floor to the roof. I

am no judge of crowds, but there must have been fully five thousand people crowded about the playing space. Perhaps a dozen of them cheered our Jordan boys as we came into sight, and then the rest of the crowd gave us a polite welcome by clapping hands. This welcome turned into a deafening uproar, which I found to be a welcome to the Putnam team, which came out upon the floor only a few seconds behind us. A band struck up the Putnam song, cheer leaders turned handsprings on the playing-floor, and it was, altogether, a most bewildering spectacle.

Besides having been interested in athletics, I have been busy with the administration of the School of Commerce, have had some teaching, some tutoring with advanced students and some considerable book-writing to do. This will explain, I hope, why I had never seen a contest previously, although basketball, I understand, has been threatening to displace football as the great popular sport. I daresay I was the only neophyte in all this tremendous throng jammed into the building—but I had a prized seat, on the bench beside Coach Lennox. I hoped he would have time to explain some of the fine points of the contest for me, but he did not. He studied that contest more closely than a chess player studies his men, and I was forced to rely on my own intelligence to understand the struggle.

"The old fight, Byers," exclaimed Lennox, just before time was called to begin the struggle. "Up and at 'em, Moore. Wilkins, let's see you win every tip-off. Let's go!"

WELL, I should observe that they went! The whistle blew, the crowd broke into another tremendous uproar, and the ten boys comprising the two teams went! They went, quickly, furiously in all directions, but chiefly in the direction of, or following, the ball. I suppose they went thoughtfully, too, and systematically, but I was too green at the game to recognize any system in it for some time.

Gradually, however, I discovered there were two systems in their mad rushing to and fro. Putnam, whose boys were on the average taller and more rugged than ours, deployed her men about the floor in more or less certain sections, the duty of each boy being to guard his section and check any opponent who ventured into it. But Jordan's system consisted of massing the boys, who were mostly smaller, in a compact group; when one of them had the ball his four team-mates rushed to him, and all five hurried and scurried down the floor in a group, flipping and tossing the ball about among them until they

[CONTINUED ON PAGE 105]



Every receiver was smothered as soon as he received the ball. But we kept it until, just under the basket, Swenson blocked Byers savagely and batted the ball out of bounds.



"To the rafts!" I hollered in Mr. Crousseau's ear. "Every man for himself!"

Robinson C. Rousseau

By Harry Irving Shumway

ILLUSTRATED BY F. STROTHMANN

CAPTAIN PEN had a fit of story-telling coming on. The boys of the Hammer and Chisel Club could sense it by the way he grinned to himself and gazed up into the cobwebby rafters of his old barn. A remark of Duck Travis had started the train of thought; something he'd seen in a paper about a man who had gone into the woods, barehanded, to live from nature. The Captain chuckled.

That calls to mind a queer experience (said Captain Pen). I knew a man who paid me to shipwreck him on a desert island. I was readin' the paper one day, in this very room, and I came on a want ad like this:

"Wanted: The services of a competent shipmaster to take charge of a voyage for a private party. Object, Adventure. Applicant must be reliable, sober and a first-class navigator. Apply Room 207, Sandstone Building."

So, havin' nothin' else to do, I made a call at the address. It said Room 207, but that room was as big as a museum and fitted up with all sorts of mahogany filin' cabinets and clackin' typewriters. A nice-lookin' young telephone girl unhooks a pair of deep-sea-divin' gadgets from her ears and asks if I want to see anybody.

"Yes, ma'am," I said. "I want to see the man who put an ad in today's paper about wantin' a mess of adventure and—"

"Oh, you wish to see Mr. Rousseau," she smiled. "He's in conference now, but maybe he'll see you."

She went into a private office, all glassed up, and I followed her inside. There was a feller sittin' at a big desk—and a more serious-lookin' man I never saw. He wore eyeglasses, and behind 'em his eyes peered into mine as if I'd just stepped on his pet cat's tail.

"Your name, sir?" he asked me.

"Capt. Penhallow G. Freedom," I said. "I came about that ad."

"Yes. You are familiar with the sea?"

"If I ain't, I'm as ignorant as a fool, because that's all I do know about," said I.

"Ever been shipwrecked?"

"Lots of times. In fact, I don't believe there's a man ever been shipwrecked more'n I have."

He almost smiled—but not quite. "Wonderful!"

he said. "Undoubtedly you are just the man I want."

What I am about to propose to you may sound fantastic, but if one considers carefully it appears quite logical.

Now I have an idea—and I have the money to carry it out.

All I need is a practical navigator to help in the proceedings.

If I pay you well, will you take the job?"

"Yes," said I, always bein' bright and careless about acceptin' a high salary. "What is it you want?"

He lowered his voice to a whisper and leaned forward.

"I want to be—shipwrecked!"

Now there was a large order and a queer one. Thinks I, "Pen, all the funny things ain't in the sea. There's

strange happenin's on land—and this is one of 'em." I

guess I looked a little startled.

"You want me to shipwreck you?" I gasped.

"I do."

"I'd admire to know the reason," says I, "seem' all the

folks I ever saw in a shipwreck seemed kind of set on

gettin' out of it."

"Unromantic souls! Bah!" he said. "It's the one

great adventure left to man. Let me explain. I have

been reading an old book to a young grandson of mine.

Maybe you know it. The name of it is 'Robinson

Crusoe."

"Oh, yes," I said. "I've been on the island where he

lived. It's full of people now."

"Romance is fadin' from the world," he said. "But

this book has charmed me to the depths. I have read

it over again, more critically, and after the second read-

ing I was struck with a great idea. Yes, sir, a great

idea."

He paused and stared at me so long I got uneasy.

"Here it is," he whispered, poundin' with his fist on

the desk. "I, too, would go on such an adventure—and

emulate the experiences of this fictional character. The

more I have thought about it the more I have wanted

to do it. Think, Captain Freedom—my name itself!

It's Fate!"

"Well, what is it?" I asked.

He pushed his business card over to me. It read,

"Robinson C. Rousseau, Investment Councilor."

"See!" he said, tremblin' a little in his excitement.

"The name is strangely like his. And all my life I've

wanted to go to sea."

"Ever been?"

"Once—to Nantasket. And I go to New York on the

Fall River Line whenever I get a chance."

I wanted to laugh, but he seemed so earnest I didn't

have the heart.

"Mr. Rousseau," I said, "imagine a little ship—away

out to sea far from land—and waves as high as this

buildin' bangin' the ship around as if they'd knock it to

pieces. Away up on the crest of one you go—and then, bang! slap! you go down into the trough. Every timber groanin' as if it was goin' to break. The wind roars like thunder—and then it rains, and hails, and—"

"Gorgeous!" he said, swallowin' hard. "Don't leave out a thing!"

"Hum!" I said, all the wind knocked out of my sails.

"Well, just imagine the ship has been knocked to bits.

You're in there swimmin' for your life. I take it you do

swim?"

"I go regularly to the tank in the University Club,"

he said, serious as an owl.

"Well, you're swimmin' through waves that lash and

foam. You look around—nothin' in sight. You swim

on and on and on. Maybe you find a beach and stagger

up on it, nearer dead than alive. It's on an island—

deserted. There are human bones near by—and wild

animals prow! all around you and—"

"Captain Freedom," he beamed, "you charm me.

You draw pictures that I'm dyin' to see for myself. Ah—

when can you get things ready? I have three months,

beginnin' July!"

I tried once more. "It is night," I said, my voice full

of drama. "The lightnin' flashes, and the thunder comes.

Off in the jungle you can hear the tom-toms beatin', the

drums of cannibals maybe. A gorilla calls from the

bushes—and a lion roars. And snakes crawl through the

giant ferns. Hyenas raise their nerve-shatterin' howls,

and elephants are trumpetin'. And that awful screech

offshore is a sea-serpent callin' to its mate—"

"Oh, magnificent!" said Mr. Rousseau. "I can hardly

wait until the first of July. Three long weeks away!

Well, Captain, will you take the job? I'll pay you hand-

somely."

"Well, yes, Mr. Rousseau, I reckon—"

"Don't call me Rousseau," he said, confidentially.

"Call me Crousseau!"

He got up and we shook hands.

"To a most successful wreck, Captain Freedom, and

lots of big waves and—er—all the joys of nature. Please

call tomorrow and we'll go over the details. Good-day,

Captain!"

HOW was that for an odd start? But I headed for

Atlantic Avenue right away. That evenin' I picked

up a few good men. One of them was a husky

colored boy and a good sailor; I'd had him on a voyage

to the Virgin Islands once. I'd always called him

Tommy, and when he signed with me I asked him what

his full name was.

"Cap'n, you want all dem names?" he grinned broadly.
 "Yes, Tommy."
 "All right, Cap'n. I'se Thomas Washington Lincoln Saturday, sah! Guess dat's a bountitude of names, Cap'n."

"What! Tommy Saturday?"
 "Yassah, Cap'n."
 "Well, the owner will be glad to hear that. Hum. Saturday! Why, that's right next door to Friday! You've heard of Robinson Crusoe?"
 "Oh, yassah, Cap'n. He dat man what wore a wild-cat's skin and slept for twenty years in de Catskill Mountains. Yas, sah!"

"You're a little mixed, Tommy, but I guess you'll do for all that. We're goin' to have Mr. Crusoe on board. You'll be his personal guard."

"Mr. Crusoe wiv us! Oh, Lordy," he stuttered, his eyes stickin' out like saucers. "You ain't foolin' poor Tommy, is yo', Cap'n?"

"You'll see soon, Tommy. In about three weeks," I told him.

A few days later I chartered a likely two-master, a good old Gloucester fishin' schooner, in pretty good shape. Mr. Crousseau, which is what I'll call him from now on, was on fire to see it. In fact, he broke away from one of those conference things to go right down to India Wharf and look at her; he even forgot his hat.

"Absolutely stunning!" he said, lickin' his lips. "Just think! In a few weeks we'll be aboard her and boundin' over the billowy main—bound for Adventure."

The schooner was named the Miranda P. Quackenbush of Boston, but that wasn't romantic enough for the new owner. He ordered me to paint "The Guinea Trader" on her stern, which he said was the name of Crusoe's ship. He left all details of riggin' and stores to me.

One thing, though, Mr. Crousseau insisted on gettin' himself, and that was his personal outfit—all the stuff he was to use in his rôle of castaway. I never saw any of it until after we'd sailed. I had plenty to do buyin' the stores and shippin' the crew. Where was I headin' for? Well, I'd touched at a small island in the Bahamas. Nobody lived on it, and it's so small you won't even find it on the map. But it looked tropical and wild enough to suit anybody.

It was a fine day when we moved slowly out through Boston Harbor and stood out to sea. Mr. Crousseau was wanderin' all around the ship, gettin' in the way and runnin' back to me with questions.

"Too bad it's so calm," he said. "I want to feel the sea under me."

"Don't worry, you will," I said. "By midnight or sooner you'll be hangin' on to your bunk to keep from goin' on your ear, or I can't smell a mess of weather comin'."



"Everything's all right now," said Captain Pen.
 "Your man Saturday is down at low-water mark, makin' footprints in the sand"

THAT storm did come, just after midnight the second day out. Pretty soon the old Atlantic got right under the schooner. Nothin' dangerous, only it would have been interestin' to a landlubber.

Pretty soon Saturday came runnin' up to me, and if I ever saw a scared colored boy he was it.

"Cap'n—Cap'n—there's a hoodoo man down below, and he's comin' up to git us. He's all in yaller wiv black beasties all over him. Dis ship am jinxed. We is all Jonahs, Cap'n, all Jonahs!"

"Behave yourself!" I ordered him, seein' the owner comin' up. "That's Mr. Crousseau. Those are yellow pajamas he's wearin', and embroidered with black dragons."

"Yassah, Cap'n—if yo' say so. But mah heart has just gone daid, Cap'n!"

"A bit rough, Cap'n, what?" said Mr. Crousseau,

comin' up to us. He seemed a little pale but was tryin' to look hearty.

"You ain't seasick?" I asked him.

"P' Seasick? I—Robinson Crousseau—seasick! I should say not! Captain, those waves must be twenty feet high."

"Oh, this is just what you might call a little ground swell. We'll strike 'em better as we get out."

"Hum," he said. "The ship will—er—stand it, I suppose?"

"These little fellers will ride almost anything. Better get some sleep, Mr. Crousseau."

He went below—and in half an hour that crazy Saturday came runnin' wild to me again. He could hardly speak this time.

"Cap'n, we is doomed," he said, teeth chatterin'.

"Look at dat man now!"

When I looked around I got a shock—and I didn't blame poor Saturday much.

Mr. Crousseau stood in the lighted hatchway, and he certainly was a sight. Around his white body was draped a goatskin, and on his legs were fur leggings, and on his head was a fur cap. An old powder-horn hung from a strap around his shoulder—and he was carryin' a big flintlock shotgun. In the other hand was a lighted lantern. Poor Saturday was shakin' like a leaf.

Mr. Crousseau stumbled up to me. "Ah, I thought I'd be prepared, you know. It seems real shipwreck tonight. If I am going to be wrecked, I want to be prepared. And I feel just in the mood."

"You can't be wrecked without any islands around," I said.

"I never thought of that," he said, thoughtfully. "Still we can build a raft while we're waiting. The storm is about to abate."

"Abate!" I said. "This weather is goin' to last for a couple of days."

"Strange. I had a notion from my reading that they abated right after they reached the peak."

"Ahem," I said. "I see you've been readin' a lot. Well, I've been readin' this Crusoe book myself, and it gave me an idea. And speakin' about rafts makes it appropriate. I've built one for you. It's a surprise and a sort of present. It's under that tarpaulin."

I went over and—er—unveiled it. That was a job I was proud of. Had a carpenter build it out of spruce logs and cypress, it would have held up a score of men. Mr. Crousseau stared at it.

"And what, pray tell, is that—er, percolator thing on the end?" he asked—and seemed annoyed.

"Percolator!" I roared. "That's an outboard motor—just the thing for raftin' de luxel!"

He frowned. "Remove it at once, Captain," he snapped. "I will have no effeminacy about this thing. Imagine Crusoe rafting to a deserted island—with a motor!"

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"Imagine yourself shipwrecked," said Captain Pen. "Maybe you find a beach and stagger up on it, nearer dead than alive. It's on an island—deserted. There are human bones near by—and wild animals prowling all around you"



Then the boat pushed off for the Miraflores again, and Rod was alone, a castaway, on the barren shore of Kip's Arm Island [PAGE 100]

Lubber's Luck

By E. B. Price

ILLUSTRATED BY COURTNEY ALLEN

A QUICK SUMMARY OF WHAT HAS GONE BEFORE

RODNEY GRANGER lives with his mother on a small farm in the harbor town of Porthaven and loves the sea. He is the son of a sea captain who was lost with his ship, and in deference to his mother's wishes he remains a landsman, though the call of the sea is in his blood. One evening, on his way home through the fields from haying, he notices in the road near by an automobile that has stalled through engine trouble. Unobserved, he approaches the two men who are nervously trying to repair the machine, and overhears a conversation that puzzles him. Not wishing to eavesdrop, he makes himself known with an offer to be of help. The two men are extremely startled by his sudden appearance, but let him help none the less. Their behavior becomes more and more peculiar, and it is obvious that they wish to detain him. Only the arrival of Newt Saunders, the rural postman, who quickly finds the trouble with the car, saves Rod from a predicament.

After supper, Rod leaves his mother with a hasty "I shan't be half an hour" and cuts through town to the docks. So strong is his longing for the sea that even the spectacle of a dingy freighter, the Miraflores, coaling up is something wonderful to his eyes. As he watches her, a slouching figure accosts him. It turns out to be Mr. Rankin, second mate, who invites him to come aboard and "take a good look." Rod eagerly accepts and under the second mate's guidance takes in everything from fo'castle to engine-room. He meets a sinister figure, who turns out to be Captain Brisbane, master of the Miraflores. Rod is left alone for a few moments and is about to find Mr. Rankin again and take his leave when the engine-room telegraph sounds and there is a sudden tremor through the ship. In a flash of panic, he realizes that the freighter is getting under way. He calls to the bridge and demands to be put ashore, but in the silence and the darkness the Miraflores swiftly gathers speed. Now, indeed, Rodney Granger's wish to go to sea is being fulfilled, but in how strange, mysterious and terrifying a way! He thinks of his mother sitting patiently at home, every instant expecting his return. But his repeated calls bring no answer.

Then Rodney realizes that in the shelter of a companionway, under a light that burns just within, a man is looking at him—

a tall figure in seaman's dungarees, leaning quietly against the door. Rodney looks—then gasps and looks again.

It is the stranger whose roadster had broken down that evening on the road to Porthaven!

CHAPTER THREE

Victory

RODNEY stood staring at the man he had recognized, stupefied, his purpose of appealing to the captain forgotten. He saw at once, now, that this was no accident, no chance carrying off by mistake. The reappearance of these men—for Rod supposed the other could not be far away—was too sinister a coincidence to be overlooked. What they had against him, or how they wished to use him, Rodney could not imagine, but here the fact of it was staring him in the face. He had been kidnaped; that was the long and short of it.

The man made no attempt to speak to him,—indeed he behaved as if he had never seen the boy before,—and when Rod stepped up to question him, he backed quietly into the companionway and was gone. Rodney, angry and anxious, hailed the bridge, and got no reply. He ran then down the wet deck, with blasts of rain spattering in suddenly upon him. The thunder was bursting tremendously, and the Miraflores was already beginning to roll a little as she met the swell from outside, at the bay's mouth. How far away Joe Bent's hay seemed, safely housed from the shower! Rod had been swept

bodily into another world, and there was but one link to connect him to the old. That was a very strong one—the one which was now giving him more anxiety than his own predicament: his mother's agony when she found that he and the steamer had disappeared together. She would think and believe the only obvious thing—that he had run away to sea.

The cruelty of that, and the impossibility of telling her how untrue it was, filled him with a dizzying surge of despair. But was it impossible to tell her? He set off again, this time plunging in through an open companionway, a new thought giving him relief. By chance, ducking around a corner, he collided with his erstwhile friend Mr. Rankin, who grinned at him, arms akimbo.

"Well," said the second mate, "I see you're still aboard. So you're going to occupy that bunk you didn't think much of. Sorry we ain't got the bridal suite available."

"Look here," Rod said, "what do you know about this? Were you in on this job when you were showing me the sights? But most of all, where's the radio room? I suppose you've got wireless. I have to send a message. I simply have to."

"Have you really?" inquired Rankin. "Whaffor? Thinkin' of broadcastin' a bedtime story, are you—or renderin' a solo about 'A Life on the Ocean Wave'?"

"I'm serious," said Rod, white-faced. "This is going to kill my mother, unless I can let her know that I'm not to blame."

"Nothin' doin'," said Rankin decidedly. "It's tough luck on the old lady, mebbe, but at the present time you just ain't in the picture at all. You just calm yourself, and be thankful you're gettin' the little cruise you was always wantin'."

"But what's it all about?" Rodney demanded. "What's back of it?"

"Don't ask me," the mate replied with a hitch of his

shoulders. "I ain't the skipper of this here *Miraflores* (ain't she romantic, though?). Well, here's your private room and bawth—willya have breakfast in bed? Lessee—you said a fella could sleep anywhere when he's tired, didn't ya? Ain't that lucky?"

Rodney slammed the door of the stuffy little hole all but in Rankin's face. He groped and turned on the dirty electric bulb that flooded the place with light, and was greeted with an oath and a growl of, "Wat you t'ink you do, annyway?" A man, fully dressed in oily clothes, lay sprawled on one of the lower bunks, glaring with sleepy eyes at Rod.

"Sorry," said the boy, "didn't know you were here. I'll switch it off." He did so, kicked off his shoes, and lay down on the other lower berth—though he didn't like its looks—because there seemed to be nothing else to do.

"You git outa dere," the man opposite advised. "Jan come in an' finda you dere he give you—" Rod guessed what he might be given, and hastily slid out of Jan's bunk.

"Well, is *this* one all right?" he demanded, climbing up to the shelf above, and at a grunt of assent from his room-mate he lay down up there. He realized suddenly that he was not sorry to lie flat. The *Miraflores* had definitely left the bay behind her and was wallowing royally in the offshore roll. The thunder had stopped, but rain still hissed into the sea. Rodney, hugely uncomfortable and in dire need of air, struggled with the porthole, which he could reach by sitting up. His cabin mate was roused to new reproof.

"You letta dat alone! You wanta get deesa place all adrif? Wat'sa matter you annyway, you lubber—where you come from annyways?" So Rod suffered, and the Portuguese swore, and the *Miraflores* rolled.

But sleep will come, even when it seems farthest away. Rod, angry, sick and worried, did actually leave behind him for a time the foul uncomfortable quarters, the giddiness and the anxiety, and did not even hear Jan come storming in to take his watch below.

BY morning, Rod had somewhat found his sea-legs—he was not the son of a deep-sea skipper for nothing. When he scrambled up on deck, glad to escape the miserable berth where he had spent the night, he found the *Miraflores* plunging northward under a swept blue sky, with a hard outline of land some ten or twelve miles away on the port side. Where was she going? Only coasting? Or would she presently lose that landfall and strike out—where? A sullen, squat man, whom he took to be the first mate, ordered Rod to go below for chow, and he found his way to an airless apartment where some men were devouring slabs of fried meat and mugs of sloppy coffee. In his still rather uneasy condition, Rod viewed this fare with distaste, but, recognizing among the men his Portuguese room-mate, he decided to eat with the rest of them, rather than be called a "lubber" again.

He escaped to the deck as soon as possible, and found there the shorter of the two men he had encountered on the Porthaven road, in earnest conversation with the captain. Their talk ceased as Rod drew near, and the captain turned with a scowl to look him up and down. The other man cleared his throat rather nervously and said, "Morning."

"Good morning," said Rod. "You're just the gentleman I want to see. Your friend wouldn't talk to me last night. I wanted to ask one of you what all this is about? And you," he spoke to the captain, "I suppose you know you're kidnaping?"

"I don't need to be told what I'm doing by no sea-sick lubber," the captain retorted.

"You ought to know what it's about," the other man said hastily. "You ought to know. No harm meant—just fixing it so what you know won't make anybody any trouble for a while."

Rodney was about to say that he knew absolutely nothing, when he suddenly reflected that it would be better to keep silence. If these men thought he had information which would hurt them, it gave him a certain hold over them, even in his seemingly helpless position. He determined to play a quite different hand, in the hope of learning something himself. He leaned forward and said suspiciously:

"What did you do with the car?"

"The car's where it'll tell no tales," the man snapped uneasily.

"H'm," said Rod. "Not so good if it were found?"

"It won't be," the man declared and walked away hurriedly. In a sudden burst of half-amused realization, it came over Rod that the *Miraflores*—the ship—was that "she" whom the men had kept waiting two hours the night before! And he had imagined romance—an elopement!

"Who is that man?" Rod asked the captain, who still leaned back against the rail, watching the boy with his small watery eyes. Rod did not expect an answer, but it came.

"Mr. Crowder, a passenger of mine. His friend is Mr. Hubbard. Anything else you'd like to know?"

"Yes," said Rod, "your name, sir, if I may inquire?"

"Brisbane," the captain returned. "Capt. George Brisbane, steamer *Miraflores*. Do you find everything in order, mister?"

"Where bound?" grinned Rodney.

"That's none of your business," growled the captain, and he turned heavily on his heel and walked away.

"They're entirely too free with the information," thought Rod. "I'll bet those are all aliases."

No further enlightened, in reality, than before, he again turned his attention toward getting some word to his mother. He must find out what sort of chap the wireless man was—whether he could be coaxed or threatened or bribed into sending a message, though what a bribe would consist of, Rod didn't know, seeing that his entire resources were the few dollars still in his pocket from Bent's haying. He could see the radio room now, and made his way quietly up there by a roundabout way in order to avoid suspicion. He looked softly round the corner of the door, unheard by the operator whose buzzing headphone was over his ears. But suddenly the man wheeled in his revolving chair and jumped up.

He was a big fellow, and he didn't look encouraging.

"I know just what you're here for," he cried, "and I can tell you right now there's nothing doing. I've got my orders, and they're worth my job to me, I can tell you."

"But see here," began Rod, "my mother—"

"Mamma'll have to get on without love and kisses from her boy," the radio man sneered. "Get out, I tell you! It's against the rules of the ship for you to be in here, anyways—clear out, or there'll be trouble."

HE took a step forward, menacing enough with his great height, and Rod had nothing to do but back ignominiously from the radio room. Thoroughly baffled and disheartened, and with reawakened anxiety for his mother burning now in his mind, he stumbled down to the main deck and stood glowering at the *Miraflores'* wake. Then, raising his eyes, he became aware of a slight figure that stood watching him attentively. He thought at first glance that it was a young boy—dressed in faded dungaree jumper and trousers. Then, to his astonishment, he saw that it must be a girl of thirteen or fourteen. She was brown as a gypsy, with a tangled mop of dark hair



That day the *Miraflores* had passed an iceberg, a mammoth prism, dipping its way lazily southward

that certainly had known neither comb nor scissors for some time. Her feet were bare and brown, and as tough as a sailor's, and she was staring out from under her hair at Rodney with sharp blue eyes that were used to meeting the dazzle of the sea.

"Who in creation are you?" she asked at once, approaching cautiously, as a wild creature approaches an unknown bait.

"Rodney Granger, a landlubber late of Porthaven," he smiled. "Who are you?"

"Can't be much of a lubber," she returned, ignoring his question, "or you'd be sick as a dog today. But who the blazes? Guess you're part of Pop's job."

"Oh," said Rod. "Oh, am I?" he added to himself. He continued aloud, "Oho! And Pop? The captain, perhaps?"

"Right," said the girl. "Me, I'm the captain's daughter. Victory—only the boys call me Vick."

Well, her name was no queerer than herself, at any rate. Was the girl bringing herself up, the only woman-kind on this rough ship? Impossible!

"Does your father often take you with him on cruises?" Rod inquired.

The girl swept a mass of hair away from her bright eyes with a dirty brown hand, and cried in scorn, "Often! Me, I wasn't quite born at sea, but pretty near. I been sailing up and down on this ship—Miraflores she is now—all over the world, ever since I was knee-high to a ship's cat. Pop won't have me ashore. Says it's no place for a girl."

"No place for a—my stars, what does he think a ship is?" Rodney demanded, amazed.

"Well, what about shore, anyways?" Victory asked. "You're sure a heap sight different from sea people. Is it shore does it? Come on and tell me." She sat herself down on a hatch cover, drew up her knees, and curled her bare toes round the sun-warm edge of it. "Come on!" she shouted again, and Rod grinned and said:

"Just how do I begin?"

"Begin with where you live. Where do you live?"

"In Porthaven," said Rod obediently, "in a little yellow house not far from the harbor. It has lilac bushes in front."

"And inside?" Victory asked, in her queer, husky, sudden voice.

"Inside? Oh, you know—just rooms. Tables and chairs."

"Beds?" demanded Victory, her eyes glittering.

"Why, of course. What would you expect?"

"Well, you don't expect beds on shipboard," she explained. "You got folks?"

"My mother," he told her. Then he sat down suddenly on the hatch cover and said: "That's what got me so horribly worried. I don't know how much you're in on all this—but, you see, I was taken away without being able to tell my mother. She'll think I've run away to sea."

"Good place to run to, ain't it?" said Victory.

"My mother doesn't think so. You see, my father was lost with his ship, and she can't bear me to have anything to do with the sea."

"Tough on you," the girl said. "Tough on her, too, I guess," she added suddenly. "There, I knew you weren't a lubber—not inside. Your pop was a skipper, too. That makes two of us. You've seen my pop?"

Rodney nodded, thinking how different his father had been from Captain Brisbane; wondering more and more keenly about this girl. "He wouldn't let me radio my mother," Rod went on. "None of 'em would. I suppose you can't shed any more light on why I'm here than anyone else?"

"Didn't even know you were here, till I saw you now."

Victory replied. "Friend of Crowder and Hubbard, are you?"

"Far from it, apparently," said Rod.

Victory whistled several bars of popular song in excellent style, and presently said, "Then—officially—you ain't my friend either. But that's not saying much."

"You mean, unofficially you'll deign to speak to me?" Rodney inquired.

"Yep," said Victory, "that's the dope. Usually I don't get much fun out of Pop's jobs, but you're sure different from anything that ever shipped with us before." She stared at him impersonally with her strange bright blue eyes, and he felt as if he were being gazed at by a mermaid or something not quite human.

"But you haven't told me," he insisted; "don't you ever live ashore, really? Your mother—I suppose—is—"

"My mother! She passed out of the picture more'n ten years ago. Poor Mom, I just remember here and there of her. She'd 'a' kept me ashore all right! She called me Victory 'cause she won, and had me born ashore 'stead of forty north and fifty west. But she didn't last. Then it was Pop's victory, you see, shipping me out again. He says he wants me where he knows where I am."

Rod thought it was the most extraordinary recital he had ever listened to. For a time he sat too dumfounded

to speak; then he said: "Well, it's certainly a queer way for a girl to be raised; I can't help thinking so. What about school?"

"Oh, I got a book or two," Victory informed him. "And I know more about navigating a ship than lots of folks that make a business of it. Me, I wouldn't take kindly to a school, I guess."

Rod, looking at her, guessed she wouldn't. Then, of a sudden, she whipped upright and scudded away



"Right," said the girl. "Me, I'm the captain's daughter. Victory—only the boys call me Vick." [PAGE 80]

with a pad of hard bare feet across the deck. She was gone, like a diving dolphin—and, looking up to see the cause of her disappearance, Rod saw Captain Brisbane's heavy figure lumbering slowly down the deck toward the place where a moment before she had been sitting.

CHAPTER IV

From Bad to Worse

RODNEY had plenty to think of. Between the very real discomforts—mental and physical—of his situation, the veiled and baffling attitude of Messrs. Crowder and Hubbard, and now the distinctly surprising appearance of this odd girl, his thoughts had variety enough to play upon. And then—there was that bit of a remark Victory had made—"Guess you're part of Pop's job." That held a sinister and puzzling hint. What was Pop's job, anyway, and where was this vessel bound?

Rod decided that so far as treatment went he was being neither well nor ill used. He was quartered like a stoker, but on the other hand he was given no work to do and had as much leisure as the two other mysterious passengers. Of course, the short one—Crowder—made occasional nervous sallies. Mr. Hubbard retained his scornful silence. But now, as a keen undercurrent to all Rod's thoughts, was running a lively speculation about the girl and a growing pity for her. Wasn't it like that brute of a bear-eyed flat-faced captain to keep her shut up here like that! The girl certainly would need a good deal of civilizing to make a real human being of her—but she wouldn't have much chance of getting it, living her life with this rough, dirty gang of ship's hands.

Rod saw her again next day. She had discarded her stained dungarees and put on a cheap little pink dress—undoubtedly in his honor. Pink was just the wrong color for her, and Rod thought he preferred her in the jumper and trousers. But though her feet were still bare, her bush of hair showed signs of a recent attempt at combing.

"Well, have you found out any more about me?" Rod inquired.

"I never durst ast Pop nothing right out," she told him, "but I get plenty o' news around the edges. It's just like I thought—you're part o' the job."

"What is your father's job?" Rod made bold to demand.

"Skipper o' the Miraflores, tramp steamer," Victory replied. "You know that. Do you like me having this dress? It's my shore clothes."

"Think I like the dungaree better, somehow," Rod said. "But see here—I don't understand where I come in. You know as well as I do that I was kidnaped or shanghaied, or whatever you please to call it, aboard

this ship. Why? I know you won't tell me, but I have to keep asking somebody."

"If you really don't know, I will tell you," said Vick, looking at him with narrowed, ice-blue eyes. "It's 'cause you know too much. Pop obliges gentlemen once'n a while outside his reg'lar trade—and you know too much for those guys Crowder and Hubbard." She had dropped her voice till it was almost inaudible. "Now do you see?"

Once more Rod was tempted to say he knew nothing—that was the joke of it—when suddenly a light began to break slowly through the obscurity with which he had been struggling all this time. There on the Porthaven road—oh, so long ago it seemed, now—those two men must have said something incriminating. In the lonely twilight they must have dropped some unwise remark that they thought he had heard. His appearance over the wall had been so silent, so unexpected. For aught they knew, he might have lain behind it long, hearing every word of plans for their getaway or statements of recent crime. What was that crime? Were they escaping murderers, bank robbers—what? At every thought, now, their guilt became more apparent to Rod. And Captain Brisbane "obliged gentlemen" once in a while, did he! Quite outside his company's orders that traffic was, undoubtedly—aiding criminals to get out of the country. Rod's thought had flown far; he had forgotten the girl who sat beside him, till her voice called him back from wild surmise.

"Tell me about your home, some more—tell me about it again. Them lilacs, and the beds. It's funny, you being so cut up over your mother missing you."

"Why funny?" Rod wondered.

"You don't hear none o' the boys wonderin' much about their mothers," Victory mused; "but then, you're just 's different as you can be. I never really got talking with anybody like you. I don't know as I've ever seen anybody like you."

She propped her chin between two brown paws and stared disconcertingly at him. Rod laughed and looked away. He could well enough have told her he had never seen anybody like her!

"I can't make you out," he said. "If you're in with your father on his particular kind of business, I should think you'd be dead against me. Wouldn't he be angry if he knew you told me what you have?"

"He'd thrash me," Victory replied calmly. "I have to dodge him. But I like you 'cause you don't curse. You're different, and I'm sorry about your ma, and I want to hear some more about the sweet peas and that little yella house."

[CONTINUED ON PAGE 100]



At the seventh stroke of the axe down went Peter into a hole of his own making

Under the Ice

By Carl H. Claudy

ILLUSTRATED BY

DUDLEY GLOYNE SUMMERS

NOT speaking to each other, not speaking, and never going to speak—never, never, never! David Herrick sat on one side of the library table, staring at an open page of Bleery's Trigonometry. Before his eyes danced a ridiculous maze of letters and numbers; and the more they danced the less sense they made in his numbed mind:

$$\cos 4A = \frac{a^2 \cos^2 A \cos^2 2A - b^2 \cos^2 B \cos^2 2B - c^2 \cos^2 C \cos^2 2C}{2bc \cos B \cos C \cos 2B \cos 2C}$$

"This transformation obviously admits of further extension." ("Oh, it does, does it?" thought David.)

Whereupon the learned Bleery went on: "The three sides of a triangle ABC being given, the angles can be determined by the formula:

$$L \tan \frac{1}{2}A = 10 + \frac{1}{2} \log (s-b) + \frac{1}{2} \log (s-a) - \frac{1}{2} \log s - \frac{1}{2} \log (s-a)$$

The student can determine two corresponding formulae for the other angles."

"Is that so?" David asked himself bitterly. Had this Bleery no more human kindness in him than that? He slammed the book, stood up, and walked across the room and back again. He knew what Peter Dufour would say, if Peter were talking to him. Peter would say, "Just elementary properties of triangles. Clear as mud, my poor Dave. See, you do this—and this—and this—" illustrating each point with a jab of his pencil on the scratch pad. And pretty soon the whole pernicious and useless nonsense would work itself out, and David would get a passing mark in class next day.

That's what would happen. But he wasn't speaking to Peter, and Peter wasn't speaking to him. Peter was writing a theme about Lord Macaulay. In Peter's eyes, Lord Macaulay was a tiresome old bore who messed up dull subjects with show-off language. David knew what Peter's theme would be like. It would be like this:

Thomas Babington Macaulay was born at Rothley Temple, Leicester, on October 25, 1800. Early in life he composed writings of strong interest to his parents. He was educated at Trinity College, Cambridge. Soon afterward he started to write essays for the Edinburgh Review, which—

Yes, that's what Peter's essay would be like. But it would be so easy to suggest things that would make it interesting! David was a great reader. He loved to find out surprising facts about authors. He wouldn't permit Peter, who hated literature, simply to crib dull facts about Macaulay out of an encyclopedia.

He could tell Peter that Macaulay was giving a gay supper to his friends, in his college room, when the news

arrived that his father had gone bankrupt for \$500,000. That was dramatic—interesting. What did young Macaulay do about it? He sold one of his prizes, a gold medal, to pay his bills. There are lots of curious facts about Macaulay. He had queer adventures in India. Later he became Secretary for War. Wasn't it Queen Victoria who wanted all the English soldiers to wear beards? How did Macaulay feel about that? Did he loyally set the fashion for the troops by sprouting a beard himself?



A stab of terror gripped David's heart. He was under the ice! Above him lay this thin, luminous, deadly ceiling, shutting out the air

A theme with just a few startling facts in it would get a high mark. Left to himself, without friendly suggestions, Peter's dull composition would be like the work of a small child. He would fail in English. But it would be so easy to help him. No—David could not help him. The cousins were not speaking!

And their quarrel had been about nothing. Nothing at all.

They had both seen an old hunting-knife lying in the woods; a miserable old knife, worth maybe ten cents in a junk store. They had both seen it at the same moment and had brought it home. They had started to quarrel over it in a friendly way. Soon, for some reason which neither of them could have explained, the quarrel ceased to be friendly and became bitter.

"You're a liar," said Peter at last.

"No man can call me a liar," replied David.

"Well you are, too!"

"You're another!"

It was like that. It wasn't dignified, it wasn't grown up, it wasn't sensible. It was like two little boys wrangling over something. David and Peter were not little boys. They were juniors in high school. But at the word "liar" both flamed into such anger that Peter smacked David's jaw, stingingly, a fraction of a second before David crouched and charged clumsily against Peter—the charge of a football guard who is not very fast on his feet.

Both boys went crashing into a corner of the room, upsetting a table which stood there, and smashing a valuable Chinese porcelain lamp. They wrestled among the sharp fragments, and David's hand and Peter's face were quite badly cut.

Then Mr. Herrick came into the room, and that was the end of the fracas. Mr. Herrick never lost his temper, but he never reversed one of his judgments, either. He told both boys they must stay in the house after six o'clock for a month.

That was bad for David. David had the leading part in the school play, which that year was "The Show Off." It is a wonderful chance for a good actor, and David had to swallow his pride, and forget his ambition, and go and tell the other members of the cast that he must resign. They told him that he was throwing them down. Then he confessed the truth, and they laughed at him for having been so childish. Their laughter hurt worse than their scorn.

It was a bad punishment for Peter, too. Peter was a

[CONTINUED ON PAGE 104]

How to Foil the Auto Thief

Here is advice on a great national problem for everyone who owns, or hopes to own, a motor car

By *Malcolm Johnson, S.B.*

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

are stolen "on order," and the markets must not be too far away.

Automobiles are stolen for three purposes. Professional automobile

thieves steal them to sell; criminals of every variety steal them to aid them in committing some sort of crime, or to escape in a hurry from the scene of one; and joyriders "borrow" them. The seventy per cent. of cars that are recovered fall mostly in the last two classifications. The people who steal cars for temporary use form a separate menace.

The first step of the auto thief is to locate the car to be stolen, usually one of two or three makes for which fences are asking. Side streets, where there is not much traffic, are good locations, and so, after eight o'clock in the evening, are the vicinities of theaters and concert halls. Once a driver has left his car and walked into a theater, the chances are good that he will be there for several hours—long enough to allow an astute thief to be many miles away. Cars painted in standard colors, and without gaudy accessories, are the most desirable.

The greatest requisite is that the car be unlocked. The average idea of an auto thief as a man equipped with a sheaf of skeleton keys, electrical equipment for wiring out ignition locks, and a pair of massive chain-cutters for use on wheel locks and the like is not correct. As a matter of fact he probably carries two or three skeleton keys and perhaps a few short pieces of copper wire. Even these he seldom uses. One of the cleverest thieves in the country, now serving a life sentence in a New England prison, claims never to have touched a locked car. The risk was unnecessary, because he was always able to find plenty of cars without even the ignition locked. There is an organization maintained by practically all the leading companies writing automobile theft insurance, known as the Automobile Underwriters Detective Bureau. This Bureau, with its many ramifications, is probably the greatest enemy the car thief has, and is in a position to know exactly how the average thief works. And Joseph P. Dumas, one of its leading officials, is authority for the statement that of all cars stolen not one in ten has been properly locked. Says Mr. Dumas, "So careless are some drivers that it is easier to steal an automobile in any large city than it is to steal a loaf of bread. As long as so many drivers are content to leave their cars with the engine running, or the keys in the lock, automobile thievery is going to flourish." Not long ago a survey of cars parked around an average city block showed not more than thirty per cent. properly and securely locked.

Reduction in used-car values has eliminated many of the more picturesque methods of theft, even if the tremendous number of unlocked cars had not made them unnecessary. Once upon a time a lock on a valve in the gasoline line was considered the last thing in safety, but for all cars except those with pressure feed the thief carried a bottle full of gasoline and a rubber tube. Placed under the hood, they made it possible to get far enough away to force the valve lock before the fuel in the bottle ran out.

Towing, once popular, is becoming rarer and rarer. A wrecking car with the name of some honest garage painted on it, or one owned by a gyp garage, and bearing its name, is used. In either case a copy of a telephone order to tow the car away is carried, for use with over-

ante to half a grand on these two, just to get them on time."

Following this talk, the young gangster walked leisurely over to a hotel near the drugstore Mrs. Doe was in the habit of patronizing. Traffic was particularly heavy there, and cars were continually pulling in and out of the line parked at the curb. Jake stood for several hours watching them in a disinterested manner. Occasionally he changed his position, in order not to attract too much attention. The arrival of Mrs. Doe ended his vigil. As soon as he saw her leave the car without the quick motion of turning a key, he walked over to it, stepped in, and drove slowly off, careful not to exceed the speed limit, or attract attention in any way.

A few miles outside the city limits he drove down a side road, got out, and took from a paper package a set of plates issued by the state in which Medbury was located. These plates he substituted for those already on the car, removed several robes from the rear seat and



Keynote Photo

This car was too thoroughly locked to steal, but thieves removed all tires and accessories. You can safeguard yourself against this by never parking in an isolated spot

threw them into the woods, and took off a particularly noticeable searchlight, which he cached under a large rock. Then he drove on to a town some fifty miles away, where he drew up at a small garage on the outskirts and demanded gasoline. The proprietor came out, quietly handed Jake an envelope and proceeded to fill the tank with gasoline. Jake put the envelope in his pocket without opening it. He knew that it contained twenty-five twenty-dollar bills.

Then Jake got out, walked to the nearest stop of the interurban trolley, took it to a point where it connected with a railroad, and continued back to the city by train.

A few minutes after he had left another man appeared from the garage, stepped into the car and drove off, arriving in a short time at Medbury, where the export and import dealer was located. The car was run into a warehouse there, where it was promptly drained of oil and gas and prepared in the usual way for a long ocean voyage. By the next morning every identifying number on it had been filed off and new ones substituted, all prominent accessories had been removed, and it was riding, completely crated, on a large van headed for the waterfront.

Two weeks later a customs official in a small European country was collecting the import tax on a new Hudson, complete with forged papers on which the numbers matched exactly those on the car. The car itself was on the way to a dealer's showrooms. And as far as Mrs. Doe is concerned that was the end of her car.

How the Thief Works

Cars valued at a third of a million dollars are stolen in the United States every twenty-four hours. Many of them are recovered,—the people best fitted to know say that about seventy per cent. are recovered sooner or later,—but the rest are gone for good. The fate of Mrs. Doe's car befalls some of them, others are shipped into Canada, a few go to Mexico; but most of them are disposed of not far from where they were stolen—but far enough to be in another state, as a rule. But most cars



Photo by courtesy of Automobile Underwriters Detective Bureau

A few of the stolen cars recovered from a quiet country garage where they were being stored awaiting sale

LOSS REPORTED BY TELEPHONE

Date,

Party Calling Mr.

Company Reporting

Make of Car

Type of Car

Year Made

Serial No.

Motor No.

Color of Body

Color of Chassis

No. of Cylinders

License No.

Date Stolen

Time Stolen

Where Stolen

Name of Assured

Address

Amount of Insurance

Policy No.

Police Notified

Purchased New or Second Hand

Was Car Locked When Stolen

Make of Lock

Received by

How many of these questions could you answer if your car were stolen today? The insurance companies must know the answer to every one of them before a claim can be accepted

MRS. JANE DOE would have been highly indignant if you had suggested that she was a careless woman. She kept her stocks and bonds in a safe-deposit vault, and her jewels in the safe in her husband's office. Whenever she left her home she was careful to lock the doors and windows. But when she went riding about town in her new sedan she was not quite so cautious. It was a nuisance to stop and see that everything was locked whenever she stopped a moment at a store. Mrs. Doe was usually in a hurry and had not time to waste with keys when she intended to be away from the car only a few minutes. Certainly, it seemed to her, no one would dare to steal such a valuable piece of property while it stood in plain sight at the curbstone.

One day Mrs. Doe learned her mistake. She pulled up in front of a drugstore, with just twenty minutes to make her purchase and get to a tea-party six miles away. Leaving the engine running, and barely waiting to close the car door, she dashed into the store, purchased six two-cent stamps and a bottle of ammonia, and dashed out again. Her car was gone.

About three weeks later it was to appear in a salesroom in a small south-European city, but Mrs. Doe had no means of knowing that. She hailed a passing policeman.

"I'll phone your license numbers to the station at once," said the officer, "but we'll need the engine and body numbers too. Could I see your registration?"

After searching her handbag twice, Mrs. Doe remembered that she kept her registration papers in the pocket of the car.

"Then let's have the number of your key. It'll be quicker to telegraph the factory for a record of the car having that key than it will be to have the Registration Bureau trace it back from your license numbers."

Mrs. Doe discovered that her keys were missing, having been left dangling in the ignition lock. Finally the policeman suggested that she telephone the Chief. He was sympathetic, and promised prompt investigation, and a thorough search. The search was made; the license number and description of the car were sent to all the police in the city and to the state constabulary, but no trace of the car was ever found.

This is what happened to it.

A few days previously two men were talking about Mrs. Doe, although her name was not mentioned. One of them was the owner of a large export and import firm in Medbury, a seacoast city a hundred miles or so away, and in another state. The other was a slight, rather handsome young gangster, who went by the name of Jake.

"Say, Jake, we got to have two more new Hudsons. Think you can get them before Tuesday?"

"Sure. Do you have to have them by Tuesday?"

"She sails at daylight Wednesday. If they ain't here by Tuesday night she goes without 'em. I'll raise the

curious police or bystanders. Locks are of no use when wrecking tackle lifts the front wheels off the ground and trundles the victim off on its rear wheels. Set brakes in a closed car with locked doors are no protection either, for any mechanic can loosen brakes from beneath in a few minutes. Nothing short of a stout chain run through the rear wheel and adjacent spring has any effect, and a hacksaw will cut through that in short order.

It is easy to see that if a thief wants your car badly enough he will get it, regardless of what you do in the way of prevention. You can even chain the front wheel to a telephone post, and return, as one driver did, to find the chain, the post, and the wheel there, but the car gone. The chances that anyone wants a car as badly as that are rare, but if you or your family have bought a new car of a popular make, with subdued paint and no particular features to make it noticeable, some thief or gyp garage may have a predatory eye on it. If that is the case, your movements and those of everyone who uses the car will be watched with great care. Someone will know whether you are in the habit of locking it or not, what hours of the day it is usually used, and by whom. If your father drives it to work, it will be known where he parks it, and how long a time there will be to work on it before possible interruptions. If the thief discovers that it is always securely locked, and ordinarily parked either in a garage or a watched parking place, his interest is likely to wane considerably.

If he decides to steal it, he may use two or three different methods. If he works with a spotter, the term given a lookout who watches for persons who may interfere with the work in hand, he may simply wait for a clear signal, short-circuit your ignition switch, and drive off. If that is too risky, and your car is of a popular make, he will drive up in a car of the same make and year, and park as close to yours as possible. He will then get in your car and attempt to start it. If interrupted, he has only to apologize profusely, point out the exact similarity of the two cars, locate his own, and drive off. If he succeeds in getting away, the spotter, who has been loitering near by, gets in the other car and follows him. Thieves who specialize in one make of car use this trick constantly, although it is probably the best-known dodge of any. Sometimes, to add an air of respectability, the thief has with him a mother and child, or a middle-aged woman—his "props."

If you find anyone tampering with your car under these circumstances or any others, it is wisest to call a policeman or some other persons before tackling the offender, provided you can do it at once.

Disposing of the Booty

Let us assume that the thief has his car unlocked and is on his way. Where does he go?

If he is working on orders from a fence, he drives as rapidly as possible—but not rapidly enough to attract attention or violate any speed laws—to some garage or other prearranged meeting-place, where he leaves the car and receives his money. If the fence is in another city, the thief will probably do as Jake did—drive up the first quiet country road, substitute new plates and remove any accessories that might be too easily identified. That will usually muddy the trail long enough to enable the thief to reach his destination safely.

Whether the fence takes it at once or not, the stolen car finds itself very shortly in a repair shop. Probably it



One of the easiest ways to prevent all possible attempts to start a motor is the removal of the distributor head. It is shown here in the lower hand. Remember to replace the cap after the head has been removed.

will be on the upper floor of what otherwise looks like a respectable garage, or it may be in the rear of some country garage where two or three cars are always lying about in various stages of repair. There the car is gone over for serial numbers, because they are the first means of identification. Some cars have only two—those on the chassis and engine. Others have numbers everywhere, stamped on the engine and all principal parts. Most of them nowadays have secret numbers, the location of which is known only to the maker. As many of the numbers as can be located are ground or filed down.

New numbers are then stamped in with a punch. Very often one or two figures of the serial numbers show the year of manufacture, and these will be left unchanged. The revised numbers are then treated with acid and heat to give them an appearance of age. Unfortunately for the thief, a process has been developed which will bring out original numbers no matter how carefully they have been ground down—a scientific contribution to sleuthing that has been the means of recovering many cars.

All prominent accessories are removed, and new ones substituted wherever the lack of them might be suspicious. If the paint is a standard color,—and the thief much prefers cars of unobtrusive shade,—it is left untouched. The top may be altered, depending on its condition. Tires are removed and replaced by others of a different make. Upholstery is changed, as well as floor mats and even floor-boards. By the time operations are completed an owner could scarcely identify the car he had lost not a week before, and cases are even on record where stolen cars have been resold to their unsuspecting original owners.

The Other Kind of Thief

If stolen cars could not be sold, they would not be stolen—except by the joyriders and the crooks who want cars for the commission of a crime. Destroying the thief's market has been an active problem ever since the automobile ceased to be a curiosity. Most of the attempts to solve it have lain along the lines of legislation designed to make a complete bill of sale from the maker through every owner necessary before registration plates could be issued. For a long time a national registration act was proposed, compelling the registration with a national bureau of every car sold throughout the United States. The extra cost to the motorist under such an act would be slight, but the opposition to it, and the considerable expense to the government, have helped to prevent its passage.

Joyriders can be stopped in just one way—by locking your car. They have not the professional thief's knowledge of keys and electrical equipment which will enable them to start a locked car. Once they find one which cannot be started it is left alone.

The crooks who have other uses for a car than selling it are a much greater menace. The police chief in one of our great cities said a short time ago: "One of the greatest aids to the modern criminal is the unlocked motor car. If it were more difficult to steal an automobile from city streets, many of the robberies we have to deal with would never have been committed."

The license numbers on a stolen car are no clue to the identity of a gang of robbers. The stolen car is the most nearly perfect means of making a quick getaway from the scene of a crime, and is being used more and more. If you look in your local newspaper today you will probably see some such headline as this:

Stolen Car Traced to Scene of Murder—Killers of Chain-Store Manager Escape.

If you leave a car unlocked, you are the potential accessory to such a crime. Like the joyriders, crooks are seldom equipped to take a locked car. Sometimes they may use only one make and carry skeleton keys for it, but any simple accessory lock in addition to the standard car locks will compel them to seek another car.

How to Protect Yourself

No one would think of leaving any article worth thousands or even hundreds of dollars unguarded in the streets—unless that article is an automobile. And no one would think of storing anything but an automobile in a small garage with a flimsy lock.

Yet millions of cars are housed every night behind locks that could be broken with one blow of a hammer, and many more millions are left every day by the side of the curb, waiting to be taken away.

Place all the identifying marks you can in secret places on the body and chassis. The usual places are inside the radiator intake and gasoline intake, on the headlight washers and underneath the dashboard. A card may be slipped under the uphol-



In oval, original numbers brought out by special treatment after they had been ground out and replaced by new ones. The original numbers show white. (Above) One of the best places for identifying marks is inside the radiator cap.

stery. The best places are those which have not been much used, but which you can readily discover for yourself.

Never park in the street when you can avoid it. If you cannot, try to choose the largest and busiest thoroughfare. Side streets where locks can be tampered with without interruption are the favorite haunt of thieves. If you are going somewhere to dinner or the theater be particularly careful. Beware of the small boy who offers to guard your car while you are away. He may be honest, but police in every city have found boys attached to stolen car rings whose duty was to "guard" cars. They act as lookouts, spotting the cars that are left unlocked and those that have detachable accessories. A good rule when parking is to return to the car a few minutes after leaving. The car and accessory thief works fast, and if he is in the vicinity is apt to be at work as soon as you have disappeared.

There are many things that can be done to the motor of a parked car to prevent its being started. Sparkplug connections can be removed, the valve on the gasoline line—located on most cars not far from the carburetor—can be shut off, fuses in the ignition line removed, or the detachable head of the distributor carried off.

The best rule for preventing the theft of a parked car is to park it in a garage; the next best is to lock it securely with one more device than the maker supplies, and to watch it as closely as possible, particularly if it is painted an ordinary color and is of a popular make.

And finally, remember that in making your car difficult to steal you are helping not only yourself but some person who might be killed by joyriders, some shopkeeper who might be murdered by automobile bandits, some pedestrian who might be robbed and assaulted by unknown persons "who escaped in an automobile," and, perhaps most of all, the police, whose duties are made doubly difficult by the careless persons who make it possible for a criminal to obtain a car, wherever he may be, in a matter of minutes.



Keyman Photo

Joyriders stole this car and wrecked it against a telephone pole. Always lock your car if you would save it from some such fate as this.



Instead of pulling up, the young people sped by, laughing loudly, one girl crying out: "Hold your horses, Grandpa!"

ALEXANDRA IV was part of a new experiment in farming at the Old Squire's, and came to us under very exciting circumstances. She was a pure-blooded Holstein calf, seven months old, for which we had paid the unusual price of seven hundred and fifty dollars.

This was not till some time after I had undertaken my not wholly successful effort to cultivate our Maine farm and make a comfortable home for the Old Squire and Grandmother Ruth, now past ninety years of age. Somewhat reluctantly I had offered to do this. Addison, Theodora and Ellen had lent aid and expected to see me make the old place prosper.

The fact was, however, that times had wholly changed. In former days farming had gone on with us in the old-fashioned way—the only way then known. Our chief interest in winters was the lumber business; but we turned to as farmers during the summer months. As a rule we planted three acres in potatoes,—to have plenty for home use and at the logging camps,—also three acres in yellow corn, an acre and a half in beans, two acres in wheat, two or three in oats, and, occasionally, an acre in barley.

But, now, owing to a decline in the lumber market, and the fact that the best of our lumber had already been cut, the farm had to be worked on new lines. The old way failed to pay the increased expenses for help and other things.

At first, for three years, we planted ten acres in sweet corn for the new canning factory at the village, six miles distant. But during two seasons untimely frosts caused serious loss and led us to abandon that venture.

With poultry and dairying we did a little better, though at the cost of much painstaking labor. We all felt that something more profitable might be accomplished with the old farm, which offered sixty acres or more in excellent tillage, and had fine upland pastures for stock.

Then at the suggestion of Addison, who came home for a few weeks every summer, we resolved to attempt the more ambitious scheme of breeding pure-blooded cattle—Holsteins and perhaps Ayrshires. Such animals at that time were being sold at fancy prices to farmers who were desirous of improving their herds, both for beef and for dairy products; and it was in furtherance of these hopeful new plans that the Old Squire and I were on our way home with Alexandra IV, from the New Hampshire stock farm where she had been purchased.

The Old Squire had accompanied me, for, although in his ninetieth year, he still took an active interest in our farming projects, and was unusually confident of this one. We drove a span of good roadsters hitched to a capacious express wagon; and we had constructed a carefully padded crate for our expensive calf, to make sure that she might suffer no harm on the long drive to her future abode.

All went well with us during the first day out from the stock farm. We were returning by way of the Weirs, Conway and Fryeburg, and had passed grim old Mt. Chocorua, on our right, and reached a point where the road skirted a large pond, when we were overtaken by one of the first automobiles we had ever seen—in fact, one of the first that ever appeared. Aboard it were two youthful fellows, with three girls on the back seat; we

Alexandra IV

By C. A. Stephens

ILLUSTRATED BY HAROLD SICHEL

supposed them to be student tourists on their way to the White Mountains.

They came up fast behind us. All horses at that time were greatly afraid of automobiles. Our span was no exception. On hearing the unusual noise and the squeal of a remarkably strident horn, they sprang forward to run, and when checked they backed suddenly, forcing the wagon partly across the road. In consequence the automobile in passing struck our high hind wheel, hauling us half round and throwing crate and calf violently out on the highway behind.

I cannot say that these young people were to blame, though they should have pulled up—as then was the custom—when they saw I was having trouble with my team. Instead they sped by, laughing loudly, one girl crying out: "Hold your horses, Grandpa!" alluding, I suppose, to the Old Squire's white hair.

As soon as I was able to control my alarmed steeds, the old gentleman took the reins while I jumped down to see what damage Alexandra IV had suffered, since the calf, much frightened, was bawling lustily. I could not discover that she had been really injured; apparently she was only startled by such rough usage, but her crate was so shattered by the fall as to require repairs with a hammer and nails.

The scene of the accident was in a forest behind the pond; but, recollecting that we had passed farm buildings before entering the woodland, I started to run back there to see what I could borrow, leaving the Old Squire in charge of the team and the calf.

I had rather farther to go than I expected, and on reaching the place found no one at home, but soon caught sight of a man at work in a distant field and made haste to join him. It proved to be the farmer himself, and he offered at once to oblige me. We returned to the house, but considerable time was lost in finding nails.

The farmer was very thoughtful for me, however. "Don't you bother to fetch that old hammer back," he said. "Just hang it up by the claws in a

bush beside the road. I shall be going out that way this afternoon, and can pick it up."

Thanking him, I started back in haste, but on the way met the Old Squire. I had been gone so long he was coming to look me up.

"I grew anxious about you," he confessed, adding with a twinkle that he feared I had been lured away.

I tried up the crate," he explained, "and drew it well out of the road. Then, in case more automobiles should come along, I unhooked the horses and secured them by their halters to trees by the wayside. So I imagine we shall find all quite safe. No one has passed except what looked to be a grocer's wagon, or a butcher's cart, which came along just after I left the team. There were two men on the seat."

We hurried back to repair the crate, when to our astonishment we found both calf and crate missing.

"Why, I drew the crate out of the highway just here," the Old Squire exclaimed. "It must be that those two fellows in that wagon have robbed us!"

Then we discovered where a team had stopped directly after passing ours, with many boot tracks all about. There could be no doubt what had occurred.

"We must catch them!" I cried; and, hitching in our span, we whipped up smartly and gave chase.

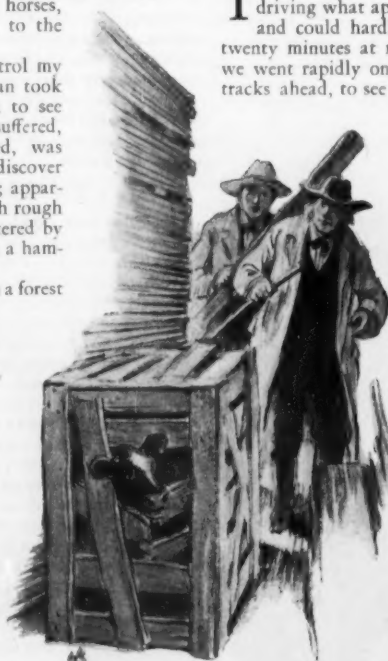
THE Old Squire remembered that the thieves were driving what appeared to be a lean old white horse and could hardly have gained a start of more than twenty minutes at most. I put our team at a run, and we went rapidly on, keeping a sharp eye to the wheel tracks ahead, to see if they turned off anywhere. There

were few farms in that locality; and, as it chanced, we met no one on the road for several miles. Then we came where the highway forked, one branch turning eastward toward Fryeburg, the other leading to North Conway and thence on northerly through the Crawford Notch to the great summer hotels.

The wagon we were following had proceeded without stopping, evidently driving fast; but at the fork of the road a man who was repairing a bridge informed us that a team with a crate in the back of the wagon had passed him less than ten minutes previously, going in the direction of North Conway. So again we gave chase, and I certainly did not spare our horses. In fact, if I slowed down a bit, the Old Squire himself grabbed the whip and applied it.

Coming at length into the long, straggling village of North Conway, not much resembling the present neat summer resort, almost the first object that caught our attention was a

[CONTINUED ON PAGE 99]



We came upon Alexandra IV in her crate on the ground beside the lumber. But we discovered nothing of the thieves



Performing animals in the streets of Calcutta. The Indian fakir often accompanies his act with animals

I HAVE devoted my life to magic. Other men have devoted their lives to art, to the sciences or to business. But magic has been my career.

The modern magician, or "illusionist," to use a word that is now somewhat more popular, differs markedly from the trickster of an earlier day. Your modern maker of mystery no longer lays claims to any occult or mysterious powers. He does lay claim to skill, and to ingenuity. He admits that he is deceiving you, and he challenges you to find out how he does it. And if he is a good magician, he is never found out. He puts his brains and his skill against the sharpness of your eyes and wits: and he always wins!

No question is ever asked of a magician oftener than, "How did you do it?" For answer, the magician must usually smile wisely and decline to answer, or else pass the question off with some response that is just as mystifying as the illusion he was asked to explain. For secrecy is his stock in trade, and the Society of American Magicians, to which every reputable illusionist in the country belongs, enforces silence on its members under the direst penalties. If a magician talks too much he may find, some day, that he has talked his means of livelihood away. No one wants to see a magician except to be mystified—and where is the mystery in seeing something that you understand?

And yet I do not believe in being too reticent. In my opinion there are some present-day magicians who carry their silence to unnecessary lengths. That is why I was glad to accept the invitation of the editor of *The Youth's Companion* to tell you something of the principles upon which rest some of the oldest illusions in the world.

During a lifetime devoted to magic I have traveled in many lands and studied the mysteries of all of them. I have traveled round the world, giving performances in such far-off countries as Australia, Java, Sumatra, Burma and Indo-China, and studying the deceptions of the native magicians in all of them, to see what contributions they might have to the magic lore of our own country. Nowhere, however, did I ever find the art of magic raised to a higher level than in India. And consequently it is largely of Indian magic that I want to write in this article. Study it carefully, for the bases on which the deception of the Indian fakir rests are the same that you will find in this country.

India—the Home of Magic

When I landed at Calcutta, and had my first glimpse of India, I felt that my goal had been attained; that at last I had come to the home of mystery. Many strange tales have been related of the marvels performed by the native conjurers of India: how they make trees grow from nothing; how they charm deadly cobras; and how they climb ropes and disappear. These were some of the mysteries that I had hoped to see; and I had made plans to find them.

As soon as I was established at my hotel in Calcutta, I sent agents into the city to bring native magicians to me. I was astonished to learn that there were more than two thousand of these performers in the city; and I was anxious to see what the best of them could do.

The first group of magicians that arrived performed the celebrated Mango Tree trick. One of them took three stout sticks and a cloth. With these he formed a tent,

Making Magic

A past master in the art of mystery takes you into his confidence

By Howard Thurston

resembling a wigwam. Beneath the tent he placed a small jar, filled with earth, in which he had planted the seed of a mango tree.

When he opened the front of the tent, a few minutes later, a small sprout had appeared. He closed the tent, and again reopened it to disclose a small tree, which bore a ripe mango upon one of its branches. The native magician had apparently grown a mango tree from a seed in less than five minutes!

Despite the fact that I saw it happen, I was not amazed;

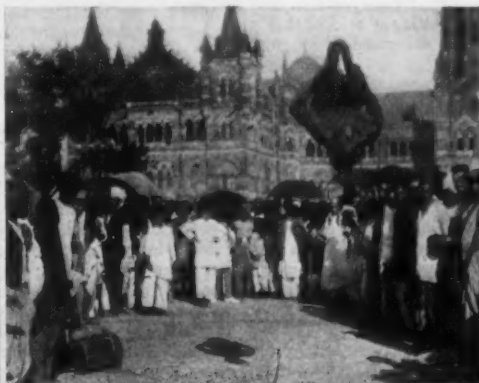


Mohammed, one of Mr. Thurston's assistants, performing a basket trick

for I had detected the method of deception which the fakir had used. I learned then and there that the magic of the Orient is fundamentally the same as the magic of America; that the same principles are practiced by the conjurers of all countries.

Now I shall explain how the fakir accomplished the trick; despite its simplicity, I may mention that the people who were with me at the time were completely deceived by it. They did not understand the principles of magic; hence they were mystified.

The "seed" which the fakir planted was a large mango, and it had been hollowed out to contain a small sprout. When the fakir placed the jar beneath the tent, he drew the sprout from the seed, so that it emerged from the dirt and when the cloth was drawn away, the first thing our eyes saw was the little sprout.



On left, the Mango Tree trick. Note the small tree under the canopy. Above, an itinerant acrobat performing in the Calcutta streets. Right, a fakir performing the Shooting Arrow trick



Lighting a fire on a man's head, as described by Mr. Thurston. The man at the left has the fire-pot

On the floor about him, the fakir had several pieces of cloth. One of his troupe was close beside him, and as the fakir drew the tent aside the accomplice pushed the mango tree from under one of the cloths so that it came beneath the cloth that formed the tent. When the fakir rearranged the wigwam, the tree went within.

The "tree," however, was nothing more than a branch of a mango tree. It was not more than three feet in height, but to make it smaller it had been bent double, and was held in that position by a cord. The string was broken by the fakir, while he was rearranging the tent, and thus he was able to produce what appeared to be a small tree.

The method was plain to me, because I was trained in magic and its methods, and I was looking for a trick. Other persons were expecting something miraculous. When the tiny sprout appeared, they were amazed, and the fakir took advantage of their temporary astonishment to obtain the folded branch. That is one of the first principles of deception: keep the attention of your audience constantly diverted. When the tree had appeared, these people were completely mystified, for they could not recall any moment wherein the fakir could have gained possession of such an object as a tree.

I saw many other performances of the Mango Tree trick; but on no occasion did I see a tree that exceeded four feet in height. Yet from the tales I had heard before I had reached India I had supposed that the fakirs were capable of producing full-sized trees, ten feet in height, with at least a dozen mangoes upon the branches.

The Secret of the Hubble-Bubble

When a person has been completely deceived by any trick, he is certain to exaggerate it. No matter how simple the secret may be, or how crude the method, anyone who does not detect it will be quite astonished. That is a factor in all magic, and the Hindu fakir, who performs out-of-doors, in a strange, Oriental setting, has great natural advantages in his favor, for foreigners are impressed by his appearance and believe that the conditions are too exacting to permit ordinary trickery.

But it is just as easy to do magic under such circumstances as it is to perform wizardry upon the stage. The program of the fakir may be as unsuited to the theater as the magic of the stage is unsuited to the public square. Yet the principles are exactly the same.

Another mystifying Indian deception is the Hubble-Bubble—sometimes called the Bunder Boat. The magician uses a small boat, not more than a foot in length. Across the center of the boat is a thwart, in which a mast is set. The mast is surmounted by a round ball.

There is a small hole in the side of the ball. The boat is filled with water and is placed upon two stones. The fakir sits close by and commences to play upon a flute. Suddenly the music ceases; and when the magician speaks to the ball a stream of water pours from the hole, only to stop at the fakir's command.

Again the magician plays his weird music. Then, at another command, the water issues forth. This strange occurrence is repeated at intervals. To all appearances the fakir has a marvelous control over an inanimate object.

Yet the secret depends upon a simple scientific principle. The apparatus is not difficult to construct. Like

[CONTINUED ON PAGE 107]





FACT and COMMENT



The World Does Move

DO you really believe," asks a reader of last month's editorial, "that the world's great benefactors lead pleasant, happy lives? Orville Wright made the first airplane flight, one of the biggest achievements in history. But did Mr. Wright get a lot of help and encouragement, when he was young? Did Henry Ford? Did Edison make money and reputations, right from the start? What about the great religious and moral leaders? If a young man sets out to help humanity, won't he have to face poverty and hostility—and if he gets any reward at all, won't it come long after he is dead?"

We may as well admit that the biographies of the great pioneers and prophets make anything but pleasant reading for a boy or girl who lacks courage. But that is not the kind of young American for whom *The Youth's Companion* is edited.

If this were the sort of paper that advises boys and girls to be soft, and to grow up into spineless mollycoddles, it would certainly not be the paper which Orville Wright, in boyhood, liked so much that he and Wilbur actually waged mimic wars on its behalf with boys on the next street who preferred one of its competitors, now dead. If this paper urged its readers to put aside all ambition except the desire to live on a silk pillow, Calvin Coolidge would not have grown up to tell us that it first convinced him there was romance outside the hills which ringed his father's farm.

Our tradition goes back straight to people who lived dangerously, took risks, settled the American continent, sailed the seven seas, and made plenty of mistakes—but not the mistakes of laziness or cowardice. There is iron in the world, as well as gold; and unless you have some iron in your make-up you will gain little gold, and less praise. Let us sketch briefly the careers of a few men worthy to be called great benefactors of mankind:

1. RICHARD ARKWRIGHT

A barber, youngest of thirteen children. Noticing how close the families who spun cotton by hand were to starvation, he invented the first machine that would spin cotton thread strong enough to be woven. He was bitterly hated by the people he tried to serve; even when, after long struggles, he had a good-sized factory, it was burned to the ground by the mob, in the presence of a large force of soldiers and police, who made no effort to interfere. Late in life Arkwright accumulated a small fortune and was knighted by the king a few years before he died.

That Arkwright escaped with his life is called by one of his biographers "a miracle." And no doubt it was. Humanity had need of this man, who taught us how to pay higher wages to the workers, at the same time reducing the price of cloth to everyone who buys it. Now look across the English Channel at one of his great fellow scientists and humanitarians:

2. A. L. LAVOISIER

This great French chemist invented a plan for lighting the streets of large cities. He helped to prepare a mineralogical atlas of France and reported to the French Academy on subjects as diverse as the theory of colors, the best chairs for invalids and the most efficient forms of water supply. He increased the production of saltpeter and lessened its cost; he conducted a model farm on which he proved the value of scientific cultivation and cattle breeding. He secured uniform weights and measures for his country, keeping poor people from being swindled; and he planned the improvement of Orleans by establishing insurance companies, savings banks, canals and almshouses. On May 8, 1794, he was guillotined at Paris. The president of the revolutionary tribunal, a man with the apt name of Coffinhal, remarked: "The French Republic has no need of scientists!"

The misnamed "republic," headed by such human wolves as Coffinhal, lasted less than three years; and the present republic of France pays better honors to her great scientific men. But turn back a century before Lavoisier to an even more wonderful discoverer:

3. GALILEO

He produced his first telescope in 1609, and soon made a better one with a power of thirty-two, inventing a system of lenses still copied exactly by the modern opera glass. Galileo discovered the mountains of the moon, the satellites of Jupiter, and the fact that the Milky Way is composed of numberless dim and distant stars. But when he advanced his belief that our world revolves on its own axis, and also around the sun, his beliefs were denounced as "absurd in philosophy, and also heretical." When he was nearly seventy, he was examined under threat of torture, was forced to recant, and was thrown into prison and made to recite, at short intervals, the seven penitential psalms. When released, he was kept a prisoner in his own house until, worn out with study and hardship, he became totally blind and died.

All these things happened long ago, and in other lands. Surely, you will say, they could not have happened in our free and enlightened United States.

Unfortunately, just such things have happened here. Elias Howe, the Yankee inventor of the sewing-machine—which has lightened women's work more than anything else in history—was kept so bitterly poor that he had to borrow a clean suit to wear at his own wife's funeral. The world honors him now; and it honors Robert Fulton, whose steamboat was the ancestor of every steamer and power ship in the world today. But that first boat left the wharf "amidst the derisive laughter of the spectators"; and for the first forty years of his life, Fulton was obliged to earn a scanty living as a painter of miniatures at a few dollars each.

Of course, the attitude toward Howe and Fulton did represent progress. Nobody in authority ordered Howe's head cut off, or Fulton's drafting room burned for his audacity in saying that ships could be moved by anything but oars or sails. Even in religious matters, where intolerance flames most strongly of all, you are no longer in danger of being burned as a witch, because you are old and friendless, or sent to the torture chamber because you doubt that the earth is flat.

Three centuries have passed since Cotton Mather, the most respected man in New England, solemnly advised capturing William Penn and his fellow colonists and selling them into slavery as "heathen." It is a long time since Penn, gentlest of all the colonizers who made our America, was thrown into the Fleet Prison in London for debt. Within the memory of men now living, equally fantastic and wicked things have been done in the name of religion, and of law.

At the end of his remarkable story in this number, Mr. John W. Hammond—who is a member of the General Electric Company—prophesies a future city in which scientists and inventors will be left to do their part of God's work without the fear of poverty, of hostility or of disgrace. We may point out to Mr. Hammond that a start is being made. His own company, and several others, maintain research laboratories which are a crude but right-minded start in this direction.

The world does move. The *Youth's Companion* has seen a century of its progress, and does not hesitate to say that surely, steadily, and every year, life is getting better for those young people who have the vision and the courage to want to help us all.

The Survival of Illiteracy

AMONG the few favorable effects of the Great War may be counted a wide-spread revolt against illiteracy. Without general education there can be no survival of democracy, and the grant of local self-government to so many new groups of people in Europe has created a new demand for popular education. Of what use is a plebiscite or a referendum if the voters cannot study the question to be decided? An ignorant electorate is not likely to choose an intelligent government.

Even Russia seems to be learning that truth. Returning travelers agree that, as never before, the Russian people are learning to read and write. The book stores are doing a thriving business, and on Sundays the museums are crowded. No doubt the people will absorb a great deal of governmental propaganda and at the frontiers the customs officers search for printed matter more eagerly than for any other form of contraband; but if the young Russians will only learn to read their own great writers, they will soon demand a share in the conduct of the government. Illiteracy was one of the foundations of the czarist power. In 1897 sixty-nine per cent. of the inhabitants of Russia, excluding Finland, could neither read nor write.

There are many other countries in Europe, not to mention other continents, where illiteracy is almost as common as it is in Russia. In Protestant lands, such as Germany and the northern countries, the proportion is much less than one per cent. In Portugal it is almost seventy per cent., in Spain more than fifty, in Serbia almost eighty. In Italy the average of illiteracy is thirty-seven, but it varies from less than eleven in the north to over seventy in the extreme south—and it is in the south that the party in power nearly always gets its heaviest majorities. In France too an astonishingly large number of young men conscripted for the army are found to be unable to read or write.

Even in this country we still have too many illiterates. Last summer the National Education Association startled the country by announcing that we had five million of them, but the figures of the census for 1920 bear out the statement. The average for the country is six per cent., but among the foreign-born it is more than thirteen per cent. and among the colored races nearly twenty-three per cent.

Inability to read and write is, of course, no proof of a lack of intelligence, but it is a heavy handicap. How can an illiterate person vote intelligently when it is so hard for the most studious to keep himself informed? Moreover, accidents are most frequent among those who cannot read printed rules and warnings. In New York State alone there are eight hundred thousand factory workers who cannot speak English. In the mines and the metal industries rules are sometimes printed in several languages, but of what use are they if a foreigner cannot read even his own language?

The Considerate Man

A GROUP of country people, gathered in the general store of a little New Hampshire village, were talking of a neighbor who had recently died. It was evident from their comments that he was not a remarkable man; not an especially good farmer, not a particularly thrifty person, not what would be called a "leading citizen." Yet every one spoke kindly of him. The reason came out when one of them, a gray-bearded, strong old man, said reflectively, "Well, George was surely a considerate man."

That was a real tribute; it is the kind of thing we should all be glad to have said of

us, after we have gone. The considerate man is one who thinks of others before he thinks of himself; whose eyes are not eternally turned inward on his own ambitions, feelings, grievances or personal interests, but look abroad on the needs and circumstances of his fellow men. In an age characterized like most other ages by a general human selfishness, he is unselfish. He "loves his neighbor as himself." What higher commendation can there be for a man, in his relations with those about him? He keeps that Eleventh Commandment that lies at the heart of Christ's gospel, for one who observes the second half of that precept will find little difficulty in obeying the first.

How much happier and more comfortable this life would be if we were all considerate men and women!

Old Boys and Young Men

PERHAPS the most curious characteristic of our own time is the oldness of our boys and the youngness of our men. A lad of sixteen is more deliberate, more practical, more influenced by facts and realities than his grandfather was at his age; but, on the other hand, a man of twenty-six is still regarded, and still regards himself, as standing on the threshold of life, whereas his grandfather had by that time fought his way into the thickest of the battle.

Today the boy of sixteen is not cherishing illusions; he is concerned with things as they are. He has no mind to be laughed at, and ridicule is to him in the nature of an argument. He abandons his dreams as childish and his convictions as inconvenient. School has taught him early what the world teaches later on—the safety that lies in custom.

So much for sixteen, but what of twenty-six?

When Clive was twenty-six, he had won half a dozen battles, had turned the tide of fortune in India, and was on his way to the governorship of Bengal. When Pitt was twenty-six, he had been prime minister of England for two years, and had shown a firmness of purpose and a consistency of action that placed him among the great statesmen of the world. His twenty-fifth birthday beheld him the foremost figure in the land. Men forgot once for all that he was young and never had occasion to remember it. Today we talk about the "dangerous boyishness" of men of forty and hold them to be too young for responsibility.

The fire of youth burns inextinguishably in some men's hearts. It burned in the heart of the gray-bearded Ulysses, when he put to sea for the last time, leaving his dull and excellent son, Telemachus, to rule the little rock-bound kingdom. It burned in the heart of that arch adventurer, Col. Fred Burnaby, when he started on his famous ride to Khiva, in defiance of deadly perils and the laws of nations. It burned in the heart of the elderly Captain Amundsen, setting out first in airplane and then in dirigible to fly across the unknown top of the world.

We may gather abundant fruits in the autumn of our lives, or we may, as Stevenson counsels, "take honorable defeat to be a form of victory." We may learn from experiences not to quarrel with a world which, however bad, is always capable of being made better; and we may substitute the faith that is built on knowledge for the hope that is born of illusions. But the chances are that years and discretion leave us in the main just what we were before we grew old and discreet. It is a sage Chinese proverb which says that, if a man is not tall when he is twenty, strong when he is thirty, and wise when he is forty, he will never be tall or strong or wise.



THE MARCH OF SCIENCE



The Greatest Bridge To Span the Mighty Hudson

ABOVE, a photograph showing the intricate maze of trusses which form one of the great anchorages for the largest suspension bridge in the world. It will cross the Hudson from 178th Street in Manhattan to Fort Lee, N. J.—an unprecedented distance for a bridge of this type. (Photo by Underwood)

Snuffing an Oil Fire

A 5-Ton Steel Cap Does the Trick

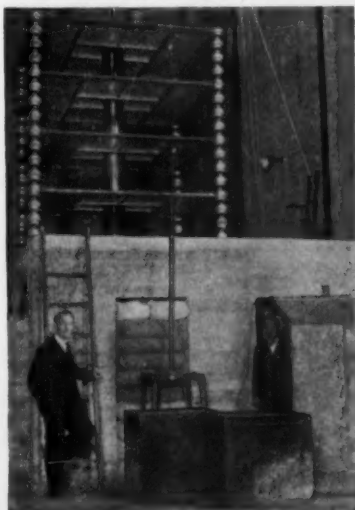
FOR two months an oil well in California burned unchecked despite the best efforts of engineers. Finally the 5-ton snuffer seen to the left extinguished the flames after engineers had dug a 200-foot tunnel 60 feet underground to divert the burning gases. (Photo by Underwood)



Sandbags for Safety

Protection against Dangerous X-Rays

PROFESSORS Lauritsen and Watson of the California Institute of Technology are shown below protected by a concrete wall and sandbags to shield them from stray radiations from the huge 1,000,000-volt X-ray tube of their own design. This tube is the largest in the world. (Photo by Wide World)



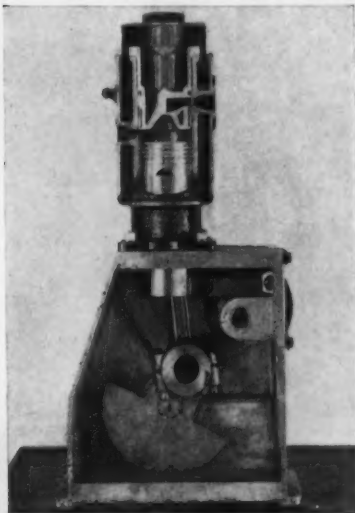
A Revolutionary Motor The "Gaw Single-Sleeve" Engine

SLEEVE-VALVE engines for automobiles are not new, but the one shown in cross-section above may well revolutionize automotive design, for instead of the usual double sleeve, hitherto thought necessary, this engine, extensively tested at Massachusetts Institute of Technology, possesses only one. Three different patents cover the new design.

A Silent, Dustless City

How We May Live in the Next Century

THE photograph at the right shows what André Tendre believes to be the city of the future. This French architect sees the streets of his future city used only by pedestrians. All vehicular traffic is carried under ground. Build-



ings are tall, in the new "set-back" style, and sunlight floods every street. (Photo by Wide World)

Launching a Salvage Submarine The Latest Word in Under-Water Design

FEW people realize how modern an invention is the submarine. But it was only in 1897 that Simon Lake (shown at the right about to enter his latest craft) built the first successful one. Warned by the terrible disasters which overtook the U. S. Navy submarines S-51 and S-4, naval engineers have now turned to the problem of making submarines safe—and of providing them with all possible salvage equipment should they be sunk in a collision. Mr. Lake is shown entering the "rescue compartment" with which he has equipped his own under-water ship. This particular craft was built some time ago, but has now been completely modernized and equipped with many experimental devices which the inventor hopes to demonstrate practically. Much interest was shown in the launching of the modernized craft. (Photo by International.)



Setting Type by Wire

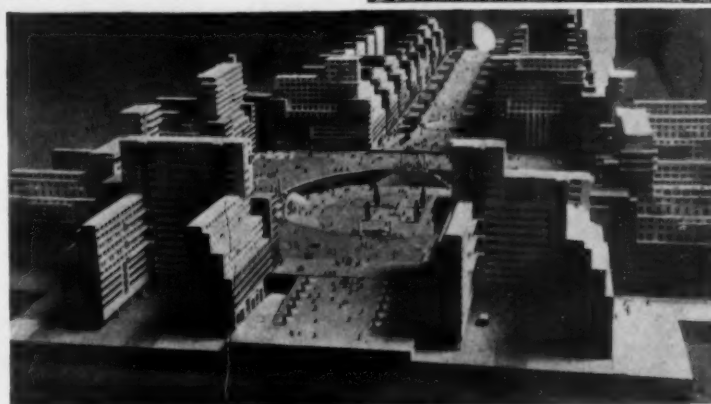
Publishers and Scientists View a New Wonder

THE "teletypesetter," shown above, now makes it possible for an operator in one city to strike keys which will simultaneously operate linotype machines in many different cities. Electrical impulses speeding over wires punch out a perforated tape which in turn is fed through a machine which operates the linotype keys. (Photo by Wide World)

A Volcanologist at Work

Risking Life in Coils of Lava

TO the right a student of the habits of volcanoes is shown, wearing for protection only a gas mask, exploring amid the monstrous rope-like coils of sulphur and mud ejected in a recent eruption from Mt. Etna. The inhabitants of the vicinity fled for their lives, leaving only a few intrepid scientists behind. (Photo by Underwood & Underwood)





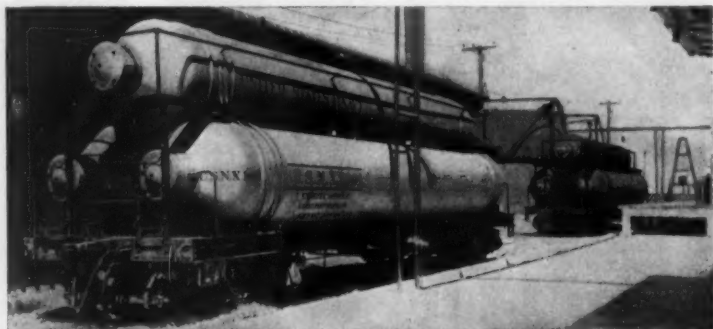
THE NEWS OF THE AIR



Uncle Sam's Great Lexington A Monster Ship of a New Design

AT the left is a striking picture of the new United States Navy aircraft carrier Lexington, taken in San Francisco Bay when the great ship was just setting out on her speed trials. Like all modern vessels of this design, the Lexington carries her funnels, masts, bridge, etc., on the starboard side, permitting unrestricted deck space to the myriads of airplanes which rise from and return to her broad deck.

The displacement of the Lexington is approximately 35,000 tons, and it cost more than \$35,000,000 to build her. She compares favorably in length with the greatest of ocean liners, for she is 900 feet from stem to stern and 100 feet in beam. She is of electric drive, and there are more than 600 motors of every size from the propulsion motors down, and over seventy-five miles of electric cable. Her engines develop no less than 180,000 horsepower and 16 huge boilers must be used to develop her full speed. Her pumps are capable of handling as much water in an hour as a city of 4,000,000 people would use in the same time. Planes take off from the forward end of the flying deck and land on the after deck, where they are retarded by ingenious stopping devices. (Photo by Wide World)



Tank Cars for Helium A New Type of Conveyance

THE United States Army and Navy are, as rapidly as possible, supplanting inflammable hydrogen by non-inflammable helium, as the buoyant gas used in lighter-than-air machines. The Bureau of Mines now possesses a 26,000-acre tract in Texas where helium may be produced at comparatively low cost, because of the high helium content of the natural gases in this vicinity. The photograph above shows two of the tank cars used by the Navy to transport the precious gas from the field to its place of utilization. The cylinders composing these cars are of forged steel—about 40 feet long and almost five feet in diameter. Their walls are two inches thick and one car can carry about 200,000 cubic feet of helium. (Photo by International)

Genius and Simplicity

An Illustrious Scientist off Duty

BELOW is Dr. Ludwig Dürr—who is no less a personage than the constructor of the giant German dirigible Graf Zeppelin, which last fall successfully completed a round trip across the Atlantic. As means of personal transportation, however, Doctor Dürr seems to prefer the bicycle which you see—disdaining even an automobile. Doctor Dürr rides to and from his office every day on this simple conveyance. (Photo by Wide World)



Automatic Airplane Control

The Inventor Shown in His Laboratory

ABOVE, a photograph of Captain Boykow, a German inventor who has just perfected an automatic gyroscopic device, which, he claims, is able to maintain an airplane on its true course without the necessity of a pilot's hands at the controls. Should it prove completely practicable in continued use, the device which Captain Boykow has invented will be a great forward step. (Photo by Wide World)

A Flying Pullman

Undreamed-of Luxury in the Air

AIR travel is now safe: the next necessity which designers face is to make it not only comfortable but luxurious, so that airways can compete with railroad and bus lines on their own terms. You will find a fascinating article on page 67 of this issue by Casey Jones, called "A Ride on the Lindbergh Limited," which tells you some of the achievements that have been made so far. The photograph at left shows a giant monoplane, the Patrician, one of the largest passenger planes ever built. It has a wing spread of 90 feet, is 63 feet long and weighs, fully loaded, 15,000 pounds. Radio entertainment, electric lights, hot and cold running water, a private stateroom, sleeping berths and a buffet are among the luxuries it offers. (Photo by Wide World)



Almost Ready for Her Maiden Flight A Dirigible Unlike Any Other Ever Launched

THE photographs above and to the left are of the all-metal steam-driven dirigible City of Glendale, which will be ready for its first ascent at about the time these words are printed. The view above is a head-on shot of the cabin with the control room in the foreground. To the rear of this is a compartment salon large enough to seat forty passengers.

The City of Glendale is a revolutionary craft. Its outer sheath is of corrugated sheet duralum-

inum with allowances provided for expansion and contraction caused by differences in temperature. Many thousands of cubic feet of hydrogen will provide it with buoyancy. As the upper photograph shows, the cabin is integral with the hull of the ship, the lower part of which may be seen in the photograph.

The methods of propulsion of the dirigible are likewise unique. Steam, and not gasoline or Blau gas, will drive her. Nor will she carry the conventional propellers. Steam turbines will be connected directly to centrifugal air-blowers and the dirigible will move forward as the result of air displacement. The photograph at the left shows one of the elevators through which it is proposed to embark and disembark passengers. (Photo by International)



Photography Seven Miles Aloft A Picture-Taking Record

THE gentlemen in the photograph at the left might not be recognizable if you saw them again, but they are Capt. A. W. Stevens and St. Clair Street of the U. S. Army, respectively photographer and pilot, who have established a new record for the height at which successful photography has been carried out. They have obtained many striking photographs of the earth from an altitude of as high as 37,854 feet—almost 7½ miles. Aerial photography has made great strides in recent years. Its importance for peacetime map-making or military reconnaissance cannot be overestimated.

The photograph to the left shows Captains Stevens and Street dressed in heated uniforms and oxygen masks to enable them to withstand the cold and rarefied upper atmosphere. (Photo by Wide World)



This department of The Youth's Companion is dedicated to all wholesome sports in season and to the upbuilding of true sportsmanship. "Don't flinch, don't foul, but the line hard."
—THEODORE ROOSEVELT.

SPORT

EDITED, UNDER DIRECTION OF OUR SPORT ADVISORY COUNCIL,
BY SOL METZGER

ADVISORY COUNCIL: E. K. Hall, Chairman Football Rules Committee; Julian W. Carriss, rowing authority and referee; Dr. James E. Naismith, inventor of basketball; Watson Washburn, former Davis Cup tennis player; Robert C. Zuppke, football coach, Illinois; John T. Doyle, American Sports Publishing Co.

BASKETBALL—ATTACK AND DEFENSE

Two Great Coaches Debate

Plays That Made a "Big Ten" Scoring Record

By Everett S. Dean

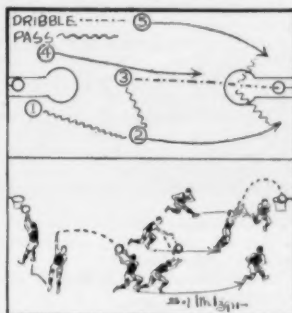
Basketball Coach, University of Indiana

THE heading for this article may look attractive, but the student of any game knows that it is not the plays that make records—but what you put into the plays!

In creating a play, the coach or captain will always find that it is important to get the maximum offensive power, but not to overlook the defensive side. An offensive play that looks strong on paper, and proves weak in a game, will take your team off the offense. All well-planned plays will succeed a reasonable percent-

takes lots of hard work in practice to perfect it. The idea of the fast break is by clever passing to get a short shot. There should be no dribbling except in the offensive end of the floor.

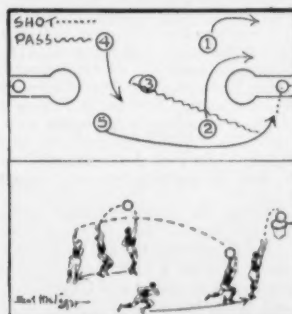
No. 1, the back guard (played for us by Schied and Mill) takes the ball off the backboard and passes it, as quickly as possible, to a forward (No. 2 in the picture), who is planted in the unguarded section of the floor, thus avoiding interception. Logan, All-Conference forward and now a Rhodes Scholar at Oxford, used to play this position. He, on receiving the ball, always passed it back to No. 3, the middle man, who should be the cleverest passer on the team. Wells, our captain this year, has every qualification for this place. He takes the pass, dribbles straight forward to the foul ring, and either goes through or passes to No. 2 or No. 5, who goes in to the basket in front of him. We used Krueger at No. 5, a left-handed forward, who was very effective from that side.



The fast-breaking offense

age of the times you try them, provided perfect execution is stressed in practice. But remember—it is the player who scores, not the play. Some players expect plays to score without help; but I am afraid most of us have never seen any of those plays.

Indiana tied with Purdue last year for the Big Ten Basketball Championship and established a



A slow break

scoring record, averaging forty points per game. To do this in the biggest basketball conference in this country required speed, cleverness, shooting ability, and fine team spirit. Our boys had these qualities, just as you can gain them through practice and self-control. Now, if you have these things, you can learn from Mr. Metzger's pictures some of the most effective plays we used.

The Fast-Breaking Offense

Speed and timing ability are the essentials of this play. It



Everett S. Dean



Eddie McNichol

The Stronger Your Defense the More You Can Attack

By Eddie McNichol

Basketball Coach, University of Pennsylvania

IS defense being developed, or is it being neglected in the present over-development of offense?

No basketball player or coach, it seems, can discuss the game without bringing up this question. The old proverb says that a good offense is the best defense. It must be admitted, however, that the ideal situation in basketball is to be on the offense for as long a period as possible, and on the defense for as short a period as possible. The writer knows of no better way to bring this condition about than to develop a strong defense.

Granted that your team must lose the ball on some occasions, the stronger your defense the

and are picked up by the other two defense men, regardless of the positions they may take on the court. This cuts the opponents' team into two sections. Your front line then endeavors to intercept any pass made to the two men in the

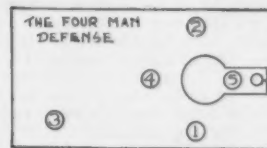


Figure 3

rear. Should another of the opponents start a cut through your front line, he is picked up by the man nearest him and played in man-to-man style.

Two-Line Zone Defense

Upon the loss of the ball (Fig. 2), your team takes the positions shown; and the men do not try to play man-to-man, but remain strictly in the zones which are shown and try to intercept passes made by the offense. If one of the opponents holds the ball in front of your front line and on the right of the court, your players move as a unit in that direction, the players maintaining their relative positions with regard to

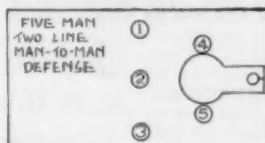


Figure 1

sooner you will regain possession of the ball, and the more time you will have for your offensive plays. A good offense is an absolute necessity; but a powerful defense is a highly desirable adjunct for a team that wants to win.

Basketball is still a young game, but it has already passed through several stages. At the start, there was no defense. Then players tried in a crude way to regain the ball through individual effort. Then came the man-to-man defense (which was the original effort at team defense), and now the modern game of basketball has so many methods of defense that it is impossible to describe them all in anything short of a complete book. However, we can quickly learn by diagrams the formations that are most often and most successfully used.

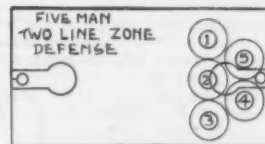


Figure 2

Two-Line Man-to-Man Defense

As soon as your team loses the ball in defense territory (Fig. 1), the men retreat to positions shown and await the approach of the opponents. The first two men down the floor are allowed to pass through the front line (players 1, 2 and 3)

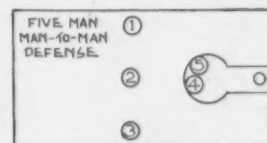


Figure 4

each other. Similarly, if the opponents threaten from the other side, the defense shifts to keep opposite them. If a long shot is attempted, Nos. 4 and 5 turn and attempt to obtain the ball off the backboard.

Four-Man Defense

Upon loss of the ball (Fig. 3), No. 3 remains in offensive territory and takes no part in the defense. He should be a fast, rangy man, and a good shot under the basket. As the offense advances toward you, each of your four other players picks off the nearest man and plays him, man to man. If No. 1 picks off the first man, No. 5 takes up his position. As soon as your team gets the ball, a long pass is made to No. 3, waiting under the basket, if he is free, or at the foul circle for a cut and return pass. This defense, you will note, converts defensive tactics very rapidly into a thrust at the opponents' goal.

Man-to-Man Defense

As soon as your team loses the ball (Fig. 4), the two men who were behind the ball when you had it rush to positions 4 and 5. The others go to the center of the court. Then the defense men attempt to pick off

(CONTINUED ON PAGE 101)



MISCELLANY



Don't Forget the Hyacinths

The Companion's Religious Article

ONE of the most beautiful sayings attributed to the prophet Mahomet is to this effect: "If I had two loaves of bread, I should sell one and buy a hyacinth."

Beauty is as valuable to the world as utility. Man doth not live by bread alone—he lives by hyacinths. Religion needs both doing and feeling, service and meditation; else it limps along in partial ineffectiveness. We need to sing "A charge to keep I have," but we must not forget to sing that other hymn, "Peace, perfect peace."

As Christendom approaches Lent, we are justified in asking, may not our American brand of spirituality learn something from the Asiatic brand? The former is strenuous, highly organized, builds huge tabernacles for evangelistic campaigns, resorts to card indexes without number. The latter sits beside a spinning-wheel in the person of Gandhi, thinks, then utters words of gentleness to all the world. Religion sometimes makes a lot of noise here in the United States. In heaven, though, it is reported to make only music.

An illustration of this contrast is to be found in a striking bit of New Testament narrative. Martha and Mary were entertaining, on a certain occasion, a dear friend for dinner. His name was Jesus. Martha was the housekeeper of the establishment. She urgently busied herself with loaves of bread, cooked a notable meal, served it faultlessly, and then apparently went to pieces nervously. For when she noticed that her sister Mary—less housekeeper than a dreamer, less interested in bread than in hyacinths—was not addressing her energies to the domestic tasks of the moment, Martha in a fit of petulance asked Jesus to rebuke the recreant sister. Jesus, however, startled her by doing precisely the opposite. He praised the woman who had cared more about talking and listening to Him than about feeding Him.

Professor Moffatt's translation of the Master's words brings out the picturesque metaphor of the original Greek. "Mary hath chosen the best dish, and she is not to be dragged away from it." It was as though Christ had said, "Martha, you are absorbed in this elaborate menu you have been serving—wonderful dishes all of them, but all meant only for the refreshment of the body. Mary has chosen a better dish, a dish that can feed the soul. Mary is not giving me a dinner; she is giving me herself. I had rather be loved than fed."

Nor is it insignificant that the writer of the Gospel of Luke recorded this story in the same chapter that gives us the parable of the Good Samaritan. He wanted the world to realize that Good Samaritan charity is not all of religion. Martha was a kind of feminine Good Samaritan, but she received a reproof from her Lord. The fact is, religion has a double mission. It must go out to bind up wounds made by the evil of the world as men travel the Jericho Road; but it must also sit at the feet of Jesus and learn of him. It will offer bread. It will not forget the hyacinths.

Softening of the Bones

The Companion's Medical Article

THERE are two diseases in which softening of the bones is a conspicuous feature; namely, rickets and osteomalacia. The former is a disease of young children, as a rule; the latter affects chiefly young adults, and this is the form we shall discuss here.

It is a chronic and slowly progressive affection marked by pain, muscular weakness and softening of the bones. It occurs but seldom in men, the principal sufferers being women in the twenties. The cause of the disease is not known but the fact that it is found chiefly in south-central Europe—Italy, Austria, Switzerland, South Germany and the Rhine Valley—would seem to point to some peculiarity in the water supply or soil conditions affecting nutrition, analogous perhaps to the iodine deficiency upon which the occurrence of endemic goiter depends.

One of the earliest symptoms is pain, indefinite in character, occurring in one or more of the extremities, in the chest or back. This pain is not always continuous, but is excited by pressure on some bone, such as the spine, the hip bones, the arm or the thigh. Next there comes on weakness of the muscles; there is a feeling of fatigue in them not associated with use or over-use, and sometimes they are jerky, their contractions causing irregular movements of the extremities

or head. After a longer or shorter period a beginning deformity, due to a slight bending of the long bones, is noticed, and this progresses until the bones become so soft that they no longer support the weight of the body. This softening, which is the characteristic anatomical change in the disease, is due to an absorption of the calcium and a deposit of fatty matter in its place.

The trouble usually lasts for a number of years, sometimes getting better, sometimes growing worse; but occasionally it progresses comparatively rapidly, a fatal termination being reached within a year.

Since the loss of calcium is at the root of this trouble it would seem that the treatment would lie in the giving of calcium-containing foods, milk for instance. Unfortunately, these sufferers

are unable to utilize calcium in the system, no matter how much may be put into the stomach. The most successful results have come from the giving of phosphorus, and in some cases from the administration of glandular extracts, such as of the thyroid, parathyroid or adrenal glands. The patients are often benefited or may even be cured by treatment, and it should be energetically pushed.

What Do You Know

About Our Presidents?

HERBERT CLARK HOOVER will be inaugurated as the thirtieth President of the United States next month. How many of these

questions on his illustrious predecessors can you answer?

1. What state has furnished the greatest number of Presidents?
2. How many Presidents have died in office? Which ones?
3. Which Presidents saw military service before their election?
4. Who was the "Bachelor President"?
5. Which President married for the first time in the White House?
6. How many Presidents served first as Vice-President? Which ones?
7. Which President was elected by the House of Representatives and not by the Electoral College?
8. Which Presidents never held civil office of any kind previous to their election as President?
9. Seven Presidents were born in Virginia. Can you name them?
10. Seven were born in Ohio. Which ones?
11. Which President was elected in the "disputed election," through the decision of an electoral commission appointed by Congress?
12. Which President added to the United States by purchase the territory between the Mississippi and the Rocky Mountains?
13. Who was the oldest of our Presidents when he took office? The youngest?
14. Which President also served as Chief Justice of the Supreme Court?
15. How many Presidents served in the Union Army during the Civil War?
16. How many Presidents signed the Declaration of Independence?
17. How many Presidents were twice elected to their office?
18. Which President was impeached before the Senate, but not convicted?
19. Who was the first President to leave the United States during his term of office?
20. What President made a tour of the world after leaving office?
21. What President was a famous hunter of big game?
22. What President was elected by a unanimous electoral vote? Which one had only one vote cast against him?
23. Three Presidents were assassinated. Where did each crime occur?
24. Which of the Presidents were conspicuous in the convention that drew up the Constitution of the United States?
25. What President took the oath of office from his own father?

[FOR ANSWERS SEE PAGE 100]

Shooting at Lloyd George

But with a Golf Ball

IN a vivacious and amusing book of reminiscence, "Behind the Brass Plate," Dr. A. T. Schofield, a famous English surgeon, tells how he once came rather near ending the career of David Lloyd George prematurely. It was during those days before the war when Lloyd George as a radical and upsetting Minister of Finance was one of the most generally unpopular men in England. His brilliant achievements in his chosen field had a way of alienating even old friends, and his position was not always a happy one.

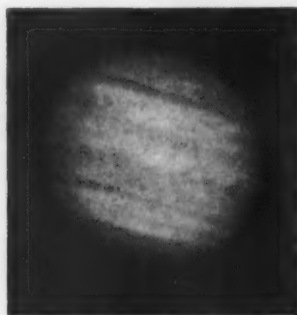
Dr. Schofield was staying at Harlech in Wales—where the men of Harlech marched from, wherever they marched to—and Lloyd George came down to spend a week there. Both men frequented the golf club; Lloyd George had all his meals there; but not a soul spoke to him. Dr. Schofield was rather shocked at this piece of ostracism, and told an official of the club that politics should not be brought into a golf club.

"My dear fellow," said the other, "it has nothing to do with politics. The beggar (so he dared to speak of the Chancellor of the Exchequer) disputes his greens fees!"

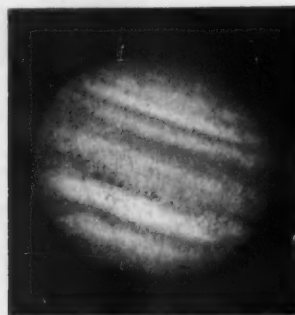
A day or two later, says Dr. Schofield, I came near ending Lloyd George's earthly career. We were both on the golf course. He had driven over "Castle Hill," and I was following. My caddy was perched on top of the hill to signal when all was clear on the other side. He moved his hand to signal that Lloyd George was still there. I mistook the signal and drove a long ball that buried itself by the side of the Chancellor. He was bareheaded and unless his skull is thicker than is generally supposed the ball would have done serious damage if it had hit him.

I told the story the next week to one of our best-known Bishops. "I wish—" he began. "Stop!" I cried. "Don't say anything more, or you may regret it."

In the Sky This Month



The planet Jupiter photographed by red light with the Crossley reflector



The same view, but taken with violet light, showing the outside of the planet

Jupiter in February

By D. H. and J. F. Chappell

Lick Observatory, University of California

WATCHING the stars for even a few nights reveals that most of the tiny points of light seem motionless, but that two or three of the very brightest are near enough to us to show their motion. When you direct even a small pair of opera- or field-glasses toward these moving bodies, they appear round, and disc-like, although the same pair of glasses shows that the other points of light (the remote stars) keep their tiny piercing sparkle.

These few near-by discs are the planets, our own sun's family. They include little Mercury, our pretty twin sister Venus, and our rival brother Mars. Beside the group of baby planets called asteroids, there is our brother Jupiter—its diameter eleven times that of the earth. It hasn't the fascinating rings of Saturn, but is a powerful comet-puller that we are becoming more and more interested in learning about. Beyond are the great Uranus and Neptune, all circling the sun.

If you look for Jupiter tonight, or any February night this year, you will not need to search long. It is the second brightest object above:

it is in the group of stars called Aries, just to the west of the Pleiades group. It is well over in the western sky now in the early evening, and is close to brilliant Venus. Venus shines twice as brightly to us as Jupiter does now. (Starshine is measured plus and minus from a standard size represented by the star Aldebaran. The negative indicates greater brightness.) Jupiter is now only —1.8 compared to Venus —4.1, but even this is more brilliant than any of the stars.

Jupiter is out where we can always see the full-lighted side, and never a crescent such as Venus and Mercury show between us and the sun. Jupiter has great belts of clouds rolling about it, two chief bands of them, called Zucchi's and Fontana's bands. The changes of color and

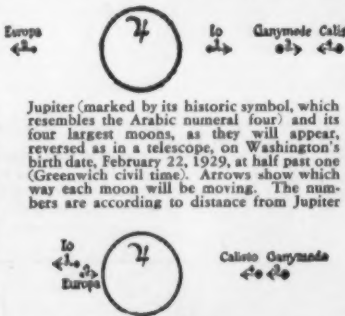
size in these are simultaneous, as if they interact. A great red spot was noted by Cassini in 1664. In the twenty-three recent years of watching, this spot has shown no variation. It seems a powerful vortex, because cloud spots seem to start across it are lost, while similar spots circulating it continue in safety. When men measure the speed of these clouds they find the deeper ones travel more slowly than those in the outer layers.

The earth is too far off to see what this big brother keeps in his pockets. It is very far off in fact—an average of three hundred and ninety million miles. But photography can be used. Here are two photographs taken both the same night (October 4) last year, one with red light, one with violet. What difference do you see between them? And can you see one of Jupiter's tiny moons, bright against the violet image? If we lay a ruler across the two prints, it appears that we have looked into Jupiter's pockets nearly an eighth of an inch, really several miles. The bigger violet-light image shows the outside. The red-light picture, however, pierced the atmosphere and got down toward the surface of Jupiter himself.

A moving-picture of Jupiter also was taken last year, showing the planet actually rolling about, the great spot disappearing to the far side, and one of Jupiter's moons flashing into view.

Jupiter has nine moons. Four of these are easy to see with a small glass. The fifth was that exciting discovery Barnard made when the great 36-inch refracting telescope at Mt. Hamilton was first opened in 1892. The other moons have been found on photographs only. Just such discoveries

are hoped for when the great new 200-inch telescope is finished, millions of dollars for which have just been given to the California Institute of Technology.

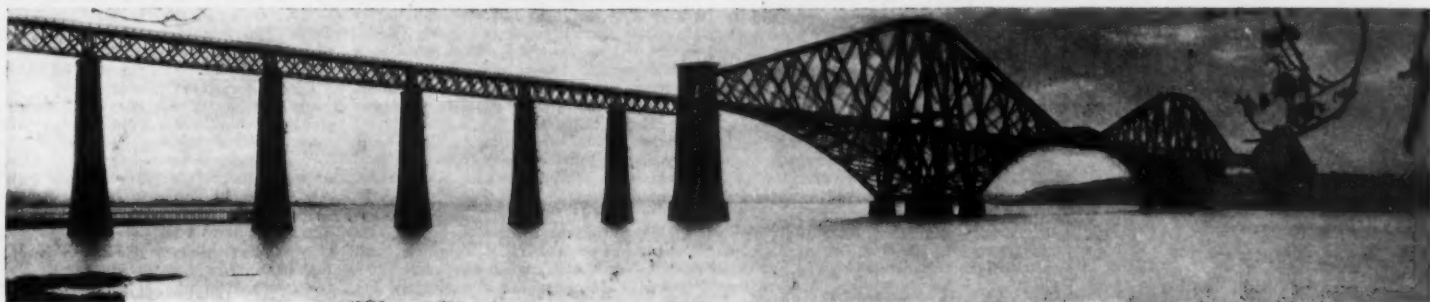


Jupiter (marked by its historic symbol, which resembles the Arabic numeral four) and its four largest moons, as they will appear, reversed as in a telescope, on Washington's birth date, February 22, 1929, at half past one (Greenwich civil time). Arrows show which way each moon will be moving. The numbers are according to distance from Jupiter

The positions at the same time on the following night. Callisto now appears closer than Ganymede. Io is projected on the other side of Jupiter. Two days before, February 21, at the same time, Ganymede would have been caught eclipsed behind the planet. Only the four largest moons of Jupiter have names. The five others are merely numbered



MISCELLANY



The famous Forth Bridge across the Firth of Forth near Queensferry in Scotland. It is 450 feet high from the base to the highest point and one and one-fifth miles in length

Highways over Water

Where Engineering Genius Finds Its Greatest Field

A FEW months ago The Companion printed an article in this department on canals, the man-made waterways that have done so much to promote travel and commerce all over the world. Even more important for these purposes than canals are the bridges that continue our highways across the widest rivers.

The first bridge was undoubtedly a fallen tree lying across a stream, but it was not long before primitive structures of timber or masonry were being built. Until the discovery of the keystone arch these bridges were built with very short spans between the piers, and resembled, on a very much smaller scale, the Britannia Tubular Bridge on the left. With the discovery of the keystone, such structures as the Marble Bridge at Peking and the Valentré Bridge at Cahors, France, began to be erected. Some of them, more than a thousand years old, may still be found in China.

The day of great bridges did not begin until late in the eighteenth century, when the use of iron, instead of timber or masonry, was introduced. About 1890 mild steel, instead of wrought iron, began to be used, and with it such enormous bridges as the Forth Bridge, which you will see at the top of this page, were constructed. This great bridge, spanning the Firth

of Forth in Scotland, took seven years to construct and remains today one of the longest and most beautiful bridges in the world.

Technically, bridges are divided into four types: arched bridges, such as the Marble Bridge, suspension bridges, such as the Brooklyn Bridge (below), cantilever bridges, of which the Forth Bridge is an example, and the simple or continuous bridge, like the Britannia Tubular Bridge. The introduction of reinforced concrete, in which both iron and concrete are combined, has made possible an entirely new type of design. What is said to be the longest bridge in the world, the Gandy Bridge in Florida, connecting St. Petersburg with the Tampa shore of Tampa Bay, is built with this material, as are many of the shorter rail and highway bridges throughout the country.

Suspension bridges are particularly interesting, since they include some of the finest bridges in modern times, and what are probably representative of the earliest attempts of primitive man to span large bodies of water. In some parts of the Far East the latter are much used, long and unsteady structures built of enormous bamboo hawsers supporting a bamboo footway. (Photos from Publishers Photo Service.)



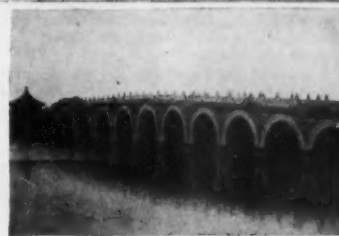
The old stone Valentré Bridge at Cahors, France. This type of stone arched bridge was much used in Europe two or three centuries ago



The Britannia Tubular Bridge in England. It was completed in 1850 and designed by Robert Stephenson, the famous English engineer



The aerial ferry across the neck of the harbor at Duluth. This is a rare type of bridge and used only under special conditions



The Marble Bridge at the Summer Palace at Peking. The eighteen arches are constructed entirely of stone



The Elbe Bridge at Hamburg, Germany. Note the peculiar S-shaped structure of the trusses



The Gandy Bridge across Tampa Bay in Florida, said to be the longest in the world. On the left is probably the best-known bridge in the United States: the Brooklyn Bridge across the East River, New York

The Mysterious Ball

The Best Trick of the Month

THREE rubber balls are used in this trick. The magician holds one ball in each hand, with the third ball on the table. He asks a spectator to hold out his hand; and in it the performer places the first two balls, closing the person's hand over them.

Then he takes the third ball and puts it in his pocket. He tells the spectator to open his hand, and there he finds the three rubber balls instead of two!

A fourth ball is required; all these balls are made of rubber from a cheap rubber sponge. They can be rough in shape and about an inch in diameter.



How the balls are held

A single ball is held in the left hand; but in the right hand two are held as one, being pressed together between the thumb and forefinger. This is something that people will not notice, for the right hand appears to hold a single ball; this illusion is due to the compressibility of sponge rubber.

The left-hand ball is placed in the spectator's hand, then the two balls as one, the left hand closing the spectator's hand into a fist so that he will not observe the extra ball.

The single ball is placed in the performer's pocket just for effect, so that when the extra ball is found in the person's hand it will seem to have come from somewhere.

If the performer wishes to show his pocket empty, he can do so very easily by retaining the ball in his hand, and dropping it into another pocket at the moment the three balls are found by the spectator.

"Mastodon Steak"

Advertising Genius on the Yukon

IN his entertaining book, "A Dog Puncher on the Yukon," Mr. Arthur T. Walden tells an amusing story of the advertising ingenuity of one of the restaurant keepers at Dawson City during the gold rush of 1898. He made use of the well-known fact that the bodies of great elephant-like animals have occasionally been found in the frozen regions of the north, preserved by ice for no one knows how many years. This has usually happened in Siberia, but there are a good many stories current in Alaska about mastodons that have been found in underground glaciers in a perfect state of preservation.

On this occasion the restaurant keeper revived these yarns and declared that such an animal had been found not far from Dawson, and that his skeleton and his hide were being shipped out to the Smithsonian Institution. He, the restaurant keeper, had bought the flesh and would sell it for a dollar and a half a plate. What was really served, of course, was good, first-class beefsteak.

However, the newspapers and the restaurant bills of fare all carried the notice "Fresh Mastodon Steak Today."

An old-timer, just come down from the creeks, wandered into town one day, and was advised by some of his friends, who knew he knew nothing about all this, to go in and try some "mastodon steak." So he went into the restaurant and called for mastodon steak. After he had eaten a few mouthfuls he remarked to the



The Rain Forest of Rhodesia

waiter that it tasted a good deal like beef. The waiter, who was getting a little sick of this mastodon business and the jokes of the customers about it, said, "Well, you big fool, what did you expect to get?" Whereupon the old-timer rose in his wrath, declared that he had ordered mastodon steak, which they advertised, and mastodon steak he would have, or nothing. Then he stamped out, mad clear through, leaving his excellent piece of steak almost untouched.

Rain from Trees

An African Mystery

A UNIQUE experience to the traveler is the journey through the Rain Forest in southern Rhodesia. An excellent description of this forest was given by the late Lord Curzon of Kedleston in his "Tales of Travel," in which he says: "The name is appropriate as well as picturesque, for the spray from the falls, rising in a stupendous column from the chasm below, falls in an incessant rain-shower on this tongue of land—three parts tree jungle and one part grass; a rain so overpowering that it drips in torrents from every branch and leaf, rustles in the coarse grass and lies in pools on the ground."

As one moves from one spot to another in search of the most impressive view of these great falls, an endless succession of rainbows play hide-and-seek through the mystic forest, lighting up every twig and branch with prismatic and weird colors.

THE ROSSELYN EXPERIMENT

[CONTINUED FROM PAGE 66]

action. During that long moment before the last switch was thrown, the men looked deep into each other's eyes. It was a kind of wordless prayer. Then came the soft little "click" as the final circuit was completed. All their attention now was on the metal crucible.

Thirty endless seconds passed,—time enough for three or four long breaths,—but nothing happened. All at once their highly strung nerves sensed a tiny crackling noise above the hum of the apparatus. Immediately after there was a succession of sharp but very faint explosions. With a spasmodic jerk Rosselyn grabbed George by the arm and dragged him toward the door. There was a tremendous, solemn detonation just as they reached the head of the stairs. The whole building was swaying crazily. Giving one fearful glance behind him, George saw the carefully tended apparatus a mass of twisted, broken junk, and in the center of everything a blindingly brilliant light.

Then came another great "boom," and they were thrown to the bottom of the flight, a suffocating shower of debris with them. Choking, blinded, bleeding, they fought their way clear and catapulted themselves through an empty window-frame.

A hundred feet away, they lay on the grass and panted. By some miracle the old barn had managed to keep standing, although it was noticeably off plumb. From inside came odd, staccato little noises—queer, metallic sounds, clickings and snapplings—and once in a while a loud, ringing impact.

Rosselyn's face was a study in bewilderment. "But it wasn't instantaneous!" he muttered. "It wasn't a sudden release of energy—not really an explosion. It was slow." Suddenly he became aware of George. "Did you appreciate that?" he demanded.

"Yes," said George as he got to his feet, "but I'm going over to do some close-range appreciating. This is interesting!"

He was about twenty feet from the house when suddenly he fell forward on his knees and then rolled over on his side.

"Help!" he shouted, a note of panic in his voice. Rosselyn jumped up, forgetful of his bruises, and dashed forward.

"What's the matter, lad?" he called as he ran. Then he too fell on his knees, and also rolled over on his side.

The watches of both were out in the air, straining toward the house against the taut chains! They were like kites in a stiff gale!

George quickly recovered his presence of mind. He struggled into a sitting position, dug his heels into the turf and began inching back away from the house, with the inventor, in tow by the coat collar. Following George's example, Rosselyn also began kicking. Five minutes of it and they were exhausted, but they were clear of the mysterious drag.

Rosselyn was smiling with satisfaction, but George was trembling.

"Did you see that?" George cried. "I'll bet that's what made us stumble and fall! I mean the magnetism or whatever it was that pulled my watch right out of my pocket and made it go like a bullet straight for the window! Phew!"

Rosselyn was looking complacently at the wrecked barn, and smiling. George became impatient.

"Look here," he demanded, "what's been going on? What was it? Where did it come from?"

"Where did it come from?" repeated Rosselyn. "I'll tell you. It came from our little tungsten crucible. And if you'd like to know anything else, you'd better follow my example—take off everything that's paramagnetic, and come along inside."

Rosselyn began taking out his watch and chain, removing his belt and even his cuff-links and collar-buttons, and laying them all on the ground with his knife and the coins he carried.

"My shoes are all sewn, so I can keep them on. How about yours?" he asked.

George inspected his shoes, and pronounced them safe. In a moment both were ready to enter the wrecked laboratory, from which came this mysterious power.

As they walked forward slowly and cautiously, Rosselyn banteringly asked George, "Do you still think I'm a dangerous scientific lunatic who's trying to destroy the world?"

George grinned sheepishly. "That's not fair," he protested. "I've learned a whole lot since last November. You mustn't hold it against me that my first impression was wrong."

"Forget it, lad," Rosselyn said happily. "Every experimenter is a little crazy in some ways. But today I've made one of those failures that are really another kind of success. Our experiment didn't work out according to schedule, perhaps, but we've got a wonderful new result that's absolutely unlooked-for—the strongest magnetic effect the world has ever known!"

They climbed to the second floor with diffi-

culty, over piles of rubbish that raised clouds of choking dust with every movement of their feet. Inside the laboratory was a scene of utter confusion. The former neat crowding of apparatus was gone. Instead was desolation—machinery broken, uprooted from bases, great holes in the floor where heavy installations had broken through, wiring torn loose and hanging in stiff curves in the air, and over the whole a powdering of dust and rubbish from walls and ceiling. Little by little, as their eyes took in the whole scene, they began to see that there was something very queer about the wreckage. All the more massive pieces of steel and iron, particularly the steel, were plastered with nondescript small pieces of metal which seemed to have been torn from every unit of machinery in the room. It was like pins and needles sticking out of a cushion!

"This is a consoling sight!" cried Rosselyn. "I don't see anything particularly consoling about it," retorted George. "I should say it was a total loss!"

Rosselyn continued to smile with satisfaction as he glanced keenly around. "Meaker," he said, "do you realize that all this was done by magnetism—supermagnetism? There's never been anything like it before! In the main, my theories have been proved. The only trouble was that I used too large a particle of uranium, although heaven knows I thought it was small enough. Nesbit must have used a piece thousands of times too large. No wonder he nearly wrecked the earth!"

"But what did you expect would turn that shaft and gear wheel rig you put up?" queried George.

"I had expected the whole reaction to take place inside the crucible. In there the supermagnetism would have set up a recurring cycle of action as long as the energy lasted. And that would have turned the shaft."

For perhaps five minutes both men stood at the

head of the stairs, looking into the room, not daring to walk in for fear of disturbing the shattered floor beams and precipitating another avalanche. Rosselyn was thinking deeply about his technical problems. George, lost in dreams of a tiny airplane with a marvelously powerful engine, was equally oblivious to the passage of time. Finally George roused himself.

"Do you realize that it must be after two, and no lunch yet?"

"You're right," said Rosselyn. "We'd better raid the pantry, so as to be ready for a hard afternoon of planning!"

Over their simple lunch they discussed the experiment and its aftermath.

"I'll just have to do finer work," declared Rosselyn. "One of the chief difficulties seems to be getting a small enough piece of uranium. I'll need a lot of delicate apparatus and fine tools. Do you think you can hold the fort here for about a week? I've got to go down to Pittsburgh to look at that new microscope of the Blisteroid Glass Works. It has lenses of the new substance, Luxenite. I rather think it's just what we need for our uranium particles."

"Of course I can hold the fort here alone," said George. "But what's to be done meanwhile?"

"Bring in my experimental radio paraphernalia from the ground floor of the barn—what's left of it—or build yourself a new set. I'd like you to play around with short waves. Find out all you can about them. This morning I used alternating current through a special apparatus, because of laboratory convenience. Eventually, though, when the process is perfected inside, we'll have to switch over to radio waves for the little plane. That will be easy. It's just a question of setting up supermagnetism in the crucible. Before you came here I thought very long waves would be needed; but my revised calculations show that it's the other way round. Don't worry about it, though. We'll have to get our gear wheel spinning with current before we'll think of using radio waves."

CHAPTER THREE

What Flies and Mosquitoes Hear

THAT evening, Rosselyn rode over to the East Calaway Airdrome. He took a small handbag. George began at once to study textbooks



To the old man's round cap were attached the circular discs of a univox radio receiver

on radio short waves. Next morning he plunged into actual work in the laboratory, using Rosselyn's books and appliances. He worked all day long, and a good part of the night. Then came another day of work, and a third. He arranged with one of Rosselyn's part-time assistants, Tommy Baker, who owned a transmitting station about six miles from the farm, to help in his short-wave experiments. Over the radio they held long talks, and Tommy gave George many practical ideas and much help.

About ten o'clock on the morning of the fourth day, George heard far down the grass-grown driveway the sound of a motor horn. Soon a huge limousine appeared; it was one of the latest model cars of 1924, driven by electric power sent through the air from the Generating Station at Chelsea. Antennae, shaped like a bat's wing, rose from the roof of the car.

George wiped his hands on a piece of cotton waste, and hurried out. The old man who emerged from it was richly dressed in a coat of artificial fur. He was so round-shouldered that

he seemed to be almost a hunchback. His face was deeply wrinkled, and his skin like leather. To his round cap were attached the circular discs of a univox radio receiver. This was the sign of an extremely busy man; a man who must at all times keep in touch with his office, and with the news of the world. And his bright little eyes showed that he was keenly alert. All in all, George decided, here was a rich and rather kind old codger.

"Anything I can do for you, sir?" he asked. The old man looked hard at George. "Took you a long time to come out, young man," he said in a cracked voice. "Where's that young scoundrel, Rosselyn?"

"Mr. Rosselyn is away on business," George answered, hardly concealing a smile. "I'm Mr. Meaker, his assistant. Won't you come in?"

"You bet I will!" he said. But instead of following George into the house he turned and hobbled directly toward the barn. Before George could stop him, he was looking in the barn door at the scene of the "magnetic explosion."

"Bless my soul!" he exclaimed. "Has a cyclone struck the place? The young scoundrel! What's he been doing here?"

George put his hand on the old man's sleeve. "Please come away," he begged. "It isn't safe. Something might fall and hurt you. We had a little accident here, and we haven't yet had time to clean up."

"An accident, hey?" the old man said in a peevish tone, backing away. "The young scoundrel! So he's gone away, and you're his assistant, hey?"

"Yes," answered George. "I beg your pardon—are you a friend of Mr. Rosselyn's?"

"Friend?" The old man was cackling. "I should say I am! William K. Tonnerway is my name. You have heard of me. Now tell me, what's Rosselyn trying to do here? I never saw such a wreck. And what's all this outside—all these wires and poles?" He pointed to an aerial of special design in the yard.

GEORGE did not quite know how to treat this visitor. He had heard of W. K. Tonnerway as one of the leading bankers in the country—a man with vast holdings in airplane stocks, and heavily interested in radio power transmission, as well. But he had not known that Mr. Tonnerway and Rosselyn were acquainted. George wondered how much he ought to tell this billionaire about Rosselyn's work and plans.

"Mr. Rosselyn has been busy on a scientific invention," he said. "He is not yet prepared to make the details known to the public."

Tonnerway spluttered. "Who cares for the public?" he shouted in his high, cracked voice. "I'm backing Rosselyn with my money, I'll have you know. He's spending money like water. My nephew told me I ought to come out here to check up. That's good advice. My nephew has a long head. If that scoundrel Rosselyn is wasting my money, I'll leave him dry! Not another cent!"

George saw at once that the situation was serious. Without money, Rosselyn could not continue his work. It was evidently up to George to smooth the matter over.

"Let me assure you," he said, earnestly, "that Mr. Rosselyn is working, as hard as he knows how, to achieve a very good and useful end. I know he is not wasting money. He realizes how important your backing is, and he is striving to please you."

"Well, I dunno," said the old man, shaking his head dubiously. "It's going on five years since I began supplying him with the cold cash. He came to me with an armful of references—Professor This, and Doctor That, and President Somebody! They think a lot of him, all that scientific crowd. But they've got no money to squander on him. Had to come to me for that! Sounded great, at first. But, looking around here, I begin to think I was stark crazy! The young scoundrel!"

George's loyalty was aroused. "Aren't you somewhat unjust?" he demanded. "If you could see Mr. Rosselyn striving day after day, working without regard to hours, buoyed up by hope and never admitting defeat, you'd think your money could not be better used."

"He's given me a contract," the cracked voice said, "and I'm to have a share in the returns—if there ever are any! But I'm feeling plumb skittish. My nephew keeps telling me I ought to look out for myself. Why, this young scoundrel hasn't as much business sense as a mountain goat!"

"But he's an inventive genius!" George said.

Mr. Tonnerway paid no attention. "What did he do at the Northern National? I'll tell you—he overdraw his account. And blessed if I didn't make that good! And then I topped that by advancing more money! Now I come here and see the house half blown up, and great

tangles of wire strung in the air!" He waved his hand dramatically. "My nephew told me what was going on. That's why I rode out here. It's high time I shut down the young scamp!"

George began to fear that the sour old capitalist really would be able to stop Rosselyn from further work. He saw that probably the best line to take with Mr. Tonnerway would be to explain Rosselyn to him as a high-minded scientist, and then to show how the labors of men like him had benefited the whole world.

"Mr. Tonnerway," said George, soberly, "you don't understand in the least the great debt the world owes to men like Rosselyn. You may call him freakish, foolish, even idiotic, but it's the foolishness of the lone thinker, the deep thinker, who is ahead of us all—off by himself, way up in front. You call him foolish? Why, some day, we'll call Rosselyn greater and wiser than any of us!"

The old man was both surprised and pleased by George's loyal defense. George, however, thought the capitalist was regarding him as a fool, and it only increased his determination to save the day.

"How would we get along if Morse hadn't made the telegraph?" he cried. "Or suppose Bell hadn't worked years to invent the telephone? Or where would we be if Edison had stopped when people called him a blundering fool? And just think of Marconi and all the other radio pioneers; and the Wright brothers with their airplane; and plenty of other inventors, clear back to Fulton's steamboat and Stephenson's locomotive! They made the world worth living in! Didn't they, now?"

Tonnerway remained silent, but his sour glance was a little more friendly. Still George thought the visitor was hostile, and he continued his plea with increased force.

"These men made the world a richer and better place to live in—for me and for you! Now we have television, and homes heated by central-station electricity, and the univox radio for individuals to carry with them, and a thousand other things that are worth while. You're a banker. That's fine, because the world must have credit methods, and he who helps the world to do business efficiently is doing a great service. But I insist that your money is helping the world toward still better days when it's backing a man like Rosselyn!"

Old Tonnerway burst into a cackle of approval. "You're a wonderful little salesman," he said. "You'd have made a fortune in some useful business!"

But George was not to be sidetracked. He was too intent upon the danger threatening the great experimental work. "What about Mr. Rosselyn?" he demanded. "Will you continue to back him?"

The capitalist shook his fist at the aerial network. "If only he didn't throw my money around so shamefully!" he cried. "I couldn't believe my nephew when he told me about the wastage here, but by Jimmy he was right!"

By this time George was thoroughly annoyed by the references to the unknown nephew. "Who is this nephew of yours?" he inquired.

"A boy who used to have your job," Tonnerway replied. "Perhaps you know him—Daniel Greenfinch."

Greenfinch! George thought immediately of the fellow who had called on him the last night before he had come to work for Rosselyn. A very unpleasant fellow, George remembered, who seemed to harbor a great deal of hard feeling against the inventor. Mr. Tonnerway interrupted George's train of thought.

"Young man," he said, "tell me your notion of all this? What's this young scamp Rosselyn doing? Has he any real ideas in his head? Hey? What do you think—will he ever amount to much?"

George was prompt with his reply. "I have the utmost faith that Mr. Rosselyn will succeed marvelously. I should hate to have you interrupt his work by cutting off his money. Personally, I'll stand by Mr. Rosselyn because I know him well—and I hope you'll stand by him too."

Mr. Tonnerway nodded absently, looked at his watch and moved toward his car. As he left, he threw back over his shoulder, casually, "I'll stop in at the Northern National and straighten out Rosselyn's account. To tell you the truth, I came here to tell him I was through with giving him money to squander. But I'll keep him going, the young scoundrel!"

THEN he was gone. George heard the limousine grind down the driveway. He sat down with relief. Phew! That certainly was a close call, he thought. Lucky thing he'd been able to persuade old Tonnerway.

What had started the whole trouble, anyway? His mind leaped back to Greenfinch. That sorehead Greenfinch! Just because he'd been fired from his job, he'd tried to influence his

uncle against Rosselyn. George tried to remember what Rosselyn had said about Greenfinch—something about his having "mocked and betrayed him." What could that mean? The big aerial?

Then George began to understand. Greenfinch, afraid that his uncle would spend some money on Rosselyn and not have enough millions left over to satisfy his precious nephew, had deliberately spied on the inventor and then betrayed his "extravagance" to Tonnerway. What a rotten trick!

Suddenly George's quick ear heard the jouncing of another car on the driveway. As he went to the door, he fully expected to see Tonnerway again, coming to announce that he'd changed his mind and was going to cut off Rosselyn after all. Instead of the big limousine, the car was a sporty roadster, and it contained two young men.

"We're from the newspapers," they announced. In spite of all its two hundred millions of population, the United States of the twenty-first century had only two daily papers—the "American Herald" in New York and the "Spinning Sphere" in San Francisco. The editions of both papers were broadcast by radio and television instantaneously to every instrument in the whole country.

"We want a story about what's happening here," one of the reporters said. "Has there been a blow-up? We understand that Mr. Rosselyn is going to take down his big antenna. Is he here? What are his plans? Let's have the facts, will you?"

Inwardly, George groaned at this barrage of questions; but outwardly he maintained a smiling calm, knowing that if even an inkling of the truth came out the reporters would somehow ferret out the whole secret, turn Rosselyn and him over to the police, and make great headlines of the incident.

"Yes, Mr. Rosselyn's away for a few days," George said. "And as for his plans, of course he'd know more about them than I do."

"But what about the explosion? What caused it?"

"Oh, that was nothing," said George casually. "Just a hard-luck accident. A short circuit started a little fire, and that set off a half-emptied drum of gasoline."

For half an hour the reporters plied George with questions, which he evaded or dodged, without seeming to do so. The newspaper men probed about the farm, peered at the wreckage in the barn-laboratory, stared at the huge aerial, went back to the laboratory, examined the farmhouse workshop, and asked dozens of questions. When finally they drove off George heaved a sigh of relief. But he feared that the reporters had a suspicion of what was the real cause of the explosion. That would be fatal.

After a good night's sleep, however, without a visit from the police, George decided that he had been successful in keeping the reporters off the trail. Cheerfully he plunged back into work.

Rosselyn's experimental short-wave radio outfit, little injured by the explosion, had been placed in perfect order by George. With Tommy Baker to send his signals from his station six miles away, George began with ten-meter wavelengths and worked down to the discovery that the set could be adjusted to receive at the wonderful wavelength of half a meter. Below that he could not go. Tommy Baker told him over the radio that half a meter was marvellous, and that he ought to be satisfied with such an achievement. But George knew that Rosselyn would expect even better results.

THAT night, just as he was about to drop off to sleep, he had an idea which brought him up sitting, and then downstairs. He called Tommy Baker again and again, until a sleepy voice answered. Then he dictated an urgent message to a college classmate and asked Tommy to transmit the message immediately. This friend of George's was a research worker in a great technical laboratory in Brooklyn, maintained under careful supervision by the government.

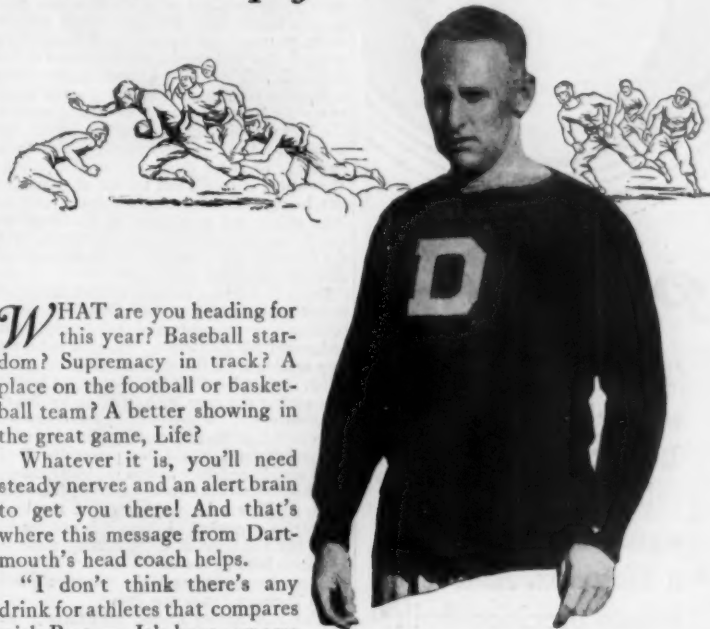
When the little package arrived next day by special delivery—the mail plane dropped it by parachute in the center of the yard—George was amazed by its lightness of weight. When he opened the box, he could see nothing at all. Had his friend forgotten to put the special diaphragm into the box? Puzzled, he felt inside it with his fingers, and they touched a soft, slippery something, with hardly more substance than a sunbeam. It was impossible to grasp it with finger and thumb. A breath might dissolve it. At last, after much thought, George took a small horseshoe magnet, and brought it to the diaphragm.

Gingerly lifting the magnet into the light from the window, George saw that the "sunbeam" had adhered to it. There was iron in the

[CONTINUED ON PAGE 94]

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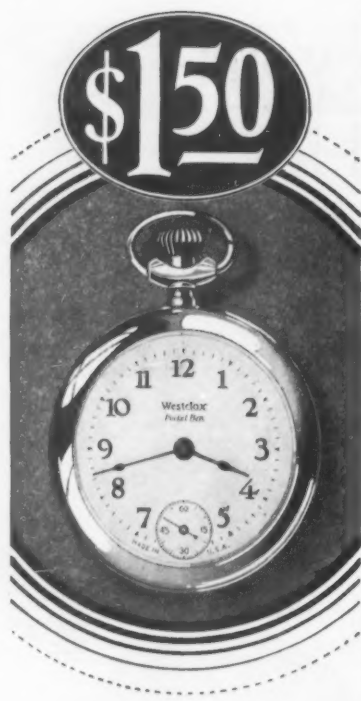
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diaphragm, then. But how thin it must be—as thin as a drop of oil spread out over the surface of a lake! He coughed, and the cobwebby film disappeared. Holding his breath, he fished with the magnet again in the box, and another "sunbeam" rose with it. There were several, then, in the box. And this was the diaphragm he wanted to mount in a radio audio instrument, connected to a loud speaker!

He worked all that day on the problem of mounting this almost invisible thing. At last he succeeded, by stopping all the window cracks with cotton, and tying a handkerchief over his nose and mouth. One of the ghostly diaphragms was in place, at last; and a letter from his friend, coming by regular mail that evening, announced that it would vibrate more than 100,000 times a second.

That was incredible! Nothing like it had ever been known before. And if vibrations of such rapidity could be obtained, what good would they do? No human ears could hear such an impossibly high-pitched sound.

Nevertheless, George radiophoned to Baker to begin sending, and sat down to receive messages at lengths from one meter down. Baker's voice, as reproduced by that fairy mechanism, sounded clear and steady; and the sound of his harmonica, which he often played as part of the tests, came with unusual clarity. George began to wonder if it were possible for him to test the diaphragm to its limit. The human ear, he knew, could not perceive sounds having a frequency of above thirty thousand a second. Then what, after all, was the use of going on? But he remembered Rosselyn's instructions to keep going, and stubbornly he continued to test the set and make his notations, hoping that the inventor would be able to understand his data and make good use of them.

Before he had been working an hour, he began to feel uncomfortably warm. Outside the temperature was reasonably cool, and he could not understand his discomfort. He told Baker to stop sending for a few minutes while he got a drink. Returning from the kitchen, he leaned idly against the door jamb, waiting for Baker to begin again. It was cool in the doorway. Then he noticed that the room was buzzing with flies and mosquitoes, and that practically all of them were immediately around the loud speaker.

"Must be molasses all over that cone," thought George. "I wonder why they find the loud speaker so attractive? I guess it is not hot in here, but the noise of them buzzing made it feel like a broiling hot day."

He sat down in front of the microphone and asked Tommy what he was doing.

"I've been fooling around with Caesar," he said. Caesar was his white collie.

"Well, let's start work again," said George. "It's hot as blazes here."

"Hot!" Tommy's voice was incredulous. "Why, it's as comfortable as could be in my place. Are you sick?"

"No," replied George; "at least I don't think so. But there are thousands of mosquitoes, flies and gnats buzzing round here—and mostly round the loud speaker. Say, Tommy, do you think it's because of the new diaphragm?"

"I don't quite follow your reasoning," said Tommy. "What on earth do you mean? What have the skeeters to do with the diaphragm?"

"Well," said George, "I don't exactly know. That's why I asked you. Just now, when I went out for a drink, you weren't sending anything, were you?"

"No. I was scratching Caesar's ears," said Tommy. "Why—did you hear anything?"

"I didn't," replied George. "But I have a hunch all these insects did."

Tommy snorted. "Are you trying to be funny?" he demanded. "There's nothing for your insects to hear from this end. I'm just sitting here with a magazine in front of me, and Caesar's in my lap licking his paws. That's all—absolutely no noise."

"Sure," agreed George; "there's absolutely no noise that we can hear. But don't forget that our ears can't get anything above thirty thousand vibrations a second, while insects can hear way over that. Now there must be lots of little noises over your way, such as breathing, or Caesar licking his paws, and twitching his ears, and cloth rubbing together. How about it?"

"Say, you'd better douse your head," was Tommy's careless response. "In a minute you'll be telling me that every time I wink my eyelashes make a howl like a warning siren!"

"Well, maybe they do!" retorted George. "And until you give me a better explanation I'll continue to think that these insects are here because they're listening to high-frequency sound waves!"

DURING the ensuing two days, George continued to experiment with the short-wave set, trying everything he could think of to shorten the wavelength. By the

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(CONTINUED FROM PAGE 93)

morning of the third day, when Rosselyn returned, George's face and hands were covered with mosquito bites and the air of the room was thick with insects.

"What's going on here?" asked Rosselyn after they had greeted each other warmly. "Are you breeding the pests?"

"It's our latest wonder," announced George with a grin; "a noiseless concert for the entertainment of the insect world!"

Rosselyn at first was puzzled. Then, seeing the expression on George's face, he began to realize that perhaps here was an important discovery.

"Gosh, man," he exclaimed, "let's have the story!"

George told the story from the beginning—how he had thought that a lighter diaphragm would make shorter waves, how he had procured the diaphragm, and then how he had interpreted the plague of insects as due to their hearing the inaudible high-frequency sounds coming in from Tommy Baker's microphone.

Rosselyn nodded. "Sounds reasonable to me, all right," he said thoughtfully. "Every movement in Tommy's room causes some vibration, most of it too high for us. But the loud speaker magnifies it a hundred times, and that's enough to reach every beetle and fly on the farm, although human ears don't get it at all."

They discussed the matter for half an hour before George realized that he had not inquired for news.

Rosselyn's face lighted up. "Yes. A wonderful microscope. Wait till you see it. It's miles ahead of anything else!"

George had decided not to mention Mr. Tonnerway's visit, as it would only cause Rosselyn unnecessary annoyance. As to the reporters, he knew that Rosselyn had heard or read their articles, and so he decided to forestall questions by telling the story of their visit.

"While you were gone," he began, "a couple of reporters dropped in to find out about the accident we had—"

Rosselyn's face grew dark with rage. "Malicious imbeciles!" he stormed. "I saw the papers! Nothing but lies and innuendo! Twaddle! The worst kind of insinuation! Spoiling reputations right and left! Spoiling our privacy!" He strode up and down, glowering at the floor. "It's the last straw," he said moodily. "I'll leave this place! I won't stand being hounded and blackguarded just because I try to use my brain."

He made good his threat. Within a week he was off on an airplane prospecting tour, and just eight days later he was back with a lease on a small ranch at Sunnerdin, Montana. Without delay they began packing, supervising the four mechanics who had been recalled to work. Every machine was crated and numbered. George's sheaf of tally sheets was almost as thick as a book. At length everything was ready. The four huge freight planes arrived, and all hands worked at stowing away the cargo.

It was the middle of a pleasant September morning in the year 2024 that the western trek of the laboratory began. Rosselyn and George followed the huge transports an hour later by fast passenger plane.

CHAPTER FOUR

Perhaps It Was Pure Accident

ROSSELYN'S first concern at Sunnerdin, after a new laboratory had been set up in the ranch house, was to prepare a long narrow tract of ground. It was to be the experimental aviation field.

"We'll be needing it soon, now," Rosselyn remarked to George, all his old ardor back. "And we don't want all the curious people around here and elsewhere in the world staring in at what we're doing."

"How are you going to fence off the field?" asked George.

"With canvas tent cloth stretched on iron piping, and supported on Douglas fir poles forty feet high," replied Rosselyn promptly. "Clear around the field. And as an extra safeguard, I'm going to run a wire just clear of the ground and two feet inside the fence. At night it will be charged with high-tension electricity. I don't think intruders will care to meet it a second time! As for airplanes, I can't protect myself against their prying; but since we're off the main air lines—I took good care to arrange that—we're not likely to have many such visitors for a while."

At first George could not help thinking that the great canvas wall was an extravagant precaution; but soon he began to see the practical common sense of it. They were going to experiment with a peculiar kind of plane, and as soon

as an inkling of what they were doing got around, there would be neither privacy nor work allowed them. Somehow or other Rosselyn managed to keep Mr. Tonnerway satisfied, for the capitalist did not fly over to Montana to bother them, although the cost of the wall was astonishingly high.

Thus they entered the home stretch of the last lap of their race. It was the early winter of 2024-25. Their little world was eight acres of Western prairie land inclosed by a canvas wall forty feet high, and a remodeled ranch house at one end of the long rectangle.

From morning to night every day both Rosselyn and George worked hard. Here their laboratory was more conveniently arranged than at the farm, for only the immediately useful apparatus was set up. Aided by the new Luxenite microscope, George worked at assembling a radio set capable of working at a wavelength of one millimeter, setting up high frequency oscillations of thirty billion cycles. The whole apparatus was so small that it looked tiny when held in the palm of the hand. Each of the high-voltage vacuum tubes was as small as a thimble; the transformers could be placed on the tip of a finger; the condensers looked like little after-dinner mints. What looked like a fine hair was really a heavy coil of wonderfully thin wire. Rosselyn bought most of this apparatus from George's friend in Brooklyn.

Rosselyn was getting ready for a new test of his method for producing energy by the destruction of matter. By the spring of 2025, all the preliminary work had been finished. Very carefully Rosselyn hooked up all the units, constantly referring to a rough sketch he had made.

"We ought to run very little risk this time," he observed, making his final inspection. "I know they're all correct, but I wish you'd check all the electrical connections. We've got to be absolutely right!"

George made a tour of the units, inspecting every connection and putting oil or graphite in the bearings. "I think we're ready now."

George found time to wonder that in spite of the previous accident he felt not the slightest nervousness. Rosselyn, too, seemed quite matter-of-fact. As he closed switch after switch and heard the different motors begin humming, each in its own voice, he seemed no more concerned than if he were turning on the lights.

Rosselyn smiled at George. "No use looking at the tungsten crucible this time," he said. "Watch the big gear wheel. When this last switch is closed we'll see some action!"

Then he threw the switch. Both men looked intently at the big gear wheel, mounted on a horizontal shaft and meshed with a pinion connected by its own shaft directly to the tungsten crucible.

Nothing happened! As the endless moments dragged along, the nervous tension of the men increased. George's hands were clenched so tightly that the nails hurt. Rosselyn was biting his lips with vexation.

When he could bear the strain no longer, Rosselyn began to walk gingerly toward the crucible. "Stay back a while, lad," he called to George. "No use endangering both of us. But be ready to open that last switch if I should call, or if anything should happen." He had reached the crucible, and had brought his ear near. For a long time he listened, a frown of deep thought on his face. Then he beckoned to George.

"The reaction came through as I'd planned," he said. "Just listen to it. But why is no energy passing from the crucible to the shaft and wheel?"

George put his head close to the tungsten box, and through the six inches of solid metal he heard, faint and muffled, a little pulsing hum. The pulsations were regular and very fast.

"She's working, all right!" cried Rosselyn. "But why in the world doesn't the energy come out?"

George rubbed his chin. "Judging from our previous experience," he said with a grin, "I should say it might be better for us if it *didn't*!"

Rosselyn ignored the little joke. He was fuming to himself, hovering about the crucible, examining the connections, even turning the wheel by hand. Nothing helped.

All that day and for several days later, Rosselyn endeavored to solve the mystery. With elaborate care he went over every step of the process, tested each individual piece of apparatus, checked their sequence, verified the connections and switchboard hook-up. Nothing availed. In desperation he even constructed a new crucible with a new particle of uranium for the energizing unit, although this required four days of the hardest kind of effort.

George was at his elbow most of the time. When a tool was needed he would offer the correct instrument, properly adjusted, without being asked for it; debris would be cleared away

quietly; new materials would appear at the work bench and be conveniently at hand when Rosselyn was ready for them. The inventor was delighted with George, but he was too much engrossed with the work to make much comment. Meanwhile the third set of experiments flowed along smoothly, and so quickly that by the beginning of April, they were once more ready for a test.

And again the geared wheel refused to turn!

ROSSELYN was furious; but with bulldog persistence he began his preparations for a new series of experiments, to check every step of the long way he had already covered. He was very thin, nervous and irritable. George began to fear for the health of his friend and employer.

"I'll tell you what," he suggested the evening of their third failure. "Suppose you lay off for a week—take a complete rest. You're so close to your problem that you must have lost perspective on it. There's no use wasting time going over everything, because everything's been tried a number of times and proved right—everything but probably one little detail. Now I think that if you'll rest a while, knowledge of that defective detail will just pop into your head. Besides, you're not looking well."

Rosselyn's mood softened instantly. He put his hand on George's shoulder. "Thank you, lad," he said gently. "But I've got to go on. But you shall have a vacation. You've richly deserved one."

George protested vehemently. "You'll have to drive me away by force!" he declared. "I'm not going to leave you in the lurch."

Each of them kept insisting that the other should take a little vacation, and the matter remained unsettled at bedtime. The next morning Rosselyn was late coming down to breakfast. It was obvious that he was not feeling well.

"Good morning," said George; "how did you sleep?"

"Quite well," answered the inventor, with an attempt at cheerfulness. But his flat, tired voice betrayed him.

"That's a fine story to tell me when you have such a cold in the head!" cried George. "You'll never do any more work if you don't take it easy now. Besides, you won't accomplish anything."

Reluctantly Rosselyn agreed. "Just for this morning," he said. "I'd like to get rid of this headache." But the headache and illness persisted.

During this time George was almost constantly at the tiny radio set he had built so laboriously the preceding winter, working at it or merely talking with Tommy Baker, who responded faithfully to every request George made for a change of wavelength. During the luncheon recess, a few days after Rosselyn had begun his rest cure, when Tommy was late in getting back to his work, George wandered aimlessly round the laboratory. At length he paused in front of the tungsten crucible, still hooked up to the rest of the apparatus. Carefully he examined the great geared wheel, trying to shake it in its bearings and making sure they were sufficiently lubricated. Why wouldn't it turn? He went back to the switchboard, closed the switches in sequence, and then returned to the crucible and listened to the mysterious pulsating hum within. No matter how hard he spun the wheel, it would not continue to revolve. It was baffling.

He went back to the switchboard and pulled all the switches. What was the use of doing everything all over again? It seemed too hopeless. Again he seated himself in front of his little radio set. Staring abstractedly at his tiny apparatus, he suddenly smiled. It would be funny, he thought, if he should hook up this diminutive thing with the sinister tungsten crucible that once had caused a great explosion. He disconnected the generator from the crucible, and attached the crucible lead-ins to the little radio's circuit, after cutting out the audio apparatus. Why he did this George never knew. It might have been pure accident—the blind chance of mere caprice; or it may have been at the mysterious bidding of a kindly Fate.

A fraction of a second later he heard the ominous growl of toothed wheels in mesh turning over. With a startled cry on his lips George whirled round. The machine was working!

Thoroughly startled, and not a little frightened at the new development, George approached the crucible gingerly. From it there came a barely perceptible hum. The shaft running from it was turning steadily and at a good rate of speed, and the little pinion whirled the ponderous cast-iron wheel around as if it were a toy. For a moment George was completely at a loss. His mind was a chaos. Then he pulled himself together and ran to get Rosselyn.

Rosselyn heard the news with outward calm. He continued to sit back in his Morris chair, a

queer, set expression about his mouth. When at length he spoke, only the slight trembling of his voice betrayed his emotion.

"What happened? How did you do it?" George had begun to recover himself. He began to see the magnitude of his discovery. "I connected the generator wires to the radio set, and now, instead of the crucible getting sixty-cycle current it's getting thirty-billion-cycle current!"

Rosselyn stared at George with a ludicrous expression of wonder. "Now why on earth didn't I see that?" he murmured. Then, with a burst of energy surprising in a supposed invalid, he jumped out of his chair. "Eureka!" he yelled at the top of his voice. "Heaven be praised! We did it!"

Together they ran down to the laboratory. The wheel was still turning! With the quick assurance of an expert, Rosselyn examined the new hook-up, nodding his head constantly.

"That's certainly the way to do it!" he exclaimed. "High frequency! Obvious! And I missed it completely!" He continued to putter around the apparatus for a few minutes, a frown of intense concentration on his face. Then he turned to George.

"If we put a regular high-frequency vacuum tube in our little plane, we'll get more current and more power for the propeller. See? And as for tube batteries and energy for lighting and heating the cabin, why not a little D. C. generator geared right to the crucible shaft? Hey?"

Rosselyn was in high spirits. "We're on the home stretch, Meaker!" he cried, clapping George on the back. "At last we're ready to build our plane. You'll take charge of that. There won't be any difficulty, because I have everything ready—bills of materials, blue prints, and specifications. Come into the library, will you?"

The "library" was a little room off the laboratory, filled with a hodge-podge of technical books, magazines, filing cabinets and calculating machines. From a cupboard Rosselyn extracted a thick roll of drawings and handed it to George.

"If you are ever in doubt about anything, be sure to ask me, no matter how busy I am," he directed. "And hurry it along!"

DURING the next three weeks George worked almost ceaselessly. A new framework of alloy tubing was erected quickly, but the fine craftsmanship required for building the rest of the plane took all George's skill and intelligence. When finally it was completed, the plane looked something like a cross between a telephone booth and a triplane. The fuselage sheathing and wing covering were of thin tungsten steel sheets, electrically welded. Three pairs of stub wings, internally braced and placed one on top of the other without stagger, completed the machine. The propeller was of the pusher type, thus giving greater visibility from within the plane, and the blades were of automatically adjusting variable pitch.

Rosselyn himself, of course, installed the matter-destroying engine. "The switch of your high-frequency circuit will be your throttle," he explained. "The plane was designed along correct aerodynamic lines. With this great little power plant nobody should have any trouble flying."

"What explanation are you going to give the public?" asked George. "They'll want to know what's inside the crucible."

"To satisfy the ordinary run of people," said Rosselyn, "I'd thought of the name electronic rotor. And as for scientists, by the time they'll be able to break open one of our laminated tungsten crucibles, they'll be too tired to be curious. And it won't matter if they do find out, because by then I'll be fully protected by patents."

"That sounds reasonable," agreed George. "Now what about a name for the plane? 'Pedestrian plane' doesn't seem quite right."

Rosselyn nodded. "I suppose so," he said. "Do you think 'Mercury car' would be better?"

"That's not very distinctive. Too many trade names use the word 'Mercury'." "I suppose that's so," admitted the inventor. A moment later he cried out, "Hey, I have it!—*Monobomo*—get me!—the Latin for 'one-man'!"

George could not repress a grin of compassion. "I hate to contradict you, Mr. Rosselyn, but the first part of it—the 'mono'—is Greek. If you want the whole thing from a Latin base, why not call it a *Soloplane*?"

Rosselyn reached out and gave George a hearty clap on the back. "My lad, for the second time you've hit the nail exactly on the head!" he cried. "You're great! *Soloplane* is just the thing! And now we're all set to go—we're ready!"

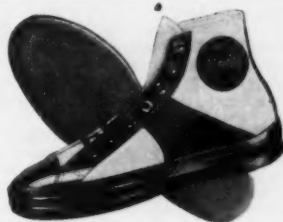
"You mean for the trial flights?"

"Yes. You're the pilot, so it's up to you to say when."

In spite of himself George began to feel some

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nervousness at the thought of actually flying the strange little machine he had labored over for so long. It was one thing to construct it on the ground, absorbed in blue-prints, and it was a very different thing to make it rise off the ground and trust one's life to it. That tiny thing! Why, it didn't look big enough to lift a kitten! However, George merely shrugged his shoulders. If he must pilot this new machine, he would not show his doubts.

"All right, then. Let's try it tomorrow morning. And don't forget to pick up the pieces if I crash!"

The day of the trial dawned beautifully. It was May 14, 2025, and it was everything a May day should be—an almost cloudless blue sky, the delicious smell of a country spring in the air, and a steady breeze from the southwest. In a little group at one side of the canvas-enclosed field stood Rosselyn and the small staff of workmen and mechanics. The Sologlane had been painted a brilliant lavender, the wings a canary yellow, and the wingtips were carmine. It looked something like a circus ticket-booth as it stood waiting at the beginning of a short runway.

With the instinct of a born pilot, George had forgotten his first disquietude and was now all eagerness to try his new machine. For the fifth time he went over every detail of the fragile metal structure to which he was going to entrust his life. The high-frequency apparatus was all contained in a cabinet beneath the seat, while the tungsten crucible, rotor shaft and small generator for lighting, heating and recharging the plate batteries were mounted on top of the plane in a streamlined nacelle. When George had satisfied himself that everything was in order, he took out of its case his compact siltex parachute, strapped it on, tested the release ring to make sure it was free, and then approached Rosselyn.

"What do you expect me to do when I get up?" he inquired. "Do you want me to try for altitude, speed, duration, maneuverability, or what?"

"No, no!" exclaimed Rosselyn. "Don't go higher than the canvas wall. There's no telling who might see you, and then we'd have no peace or even safety. Just fly around inside the inclosure. After you get the feel of it you might try some stunts, to see if you can get some ideas on improving the design. You've a grand prospect for your flight. Good luck, lad!" He shook hands warmly.

As George climbed into the queer vertical fuselage, he felt some misgivings over Rosselyn's parting words. "Pahaw!" he rebuked himself. "You're as scary as an old maid!" As he waved his hand to the watchers his face was completely unconcerned.

Notch by notch George pulled back the control switch, and when the propeller had picked up enough to make the plane tremble with eagerness he released the brakes. Immediately the machine began to roll forward and after a run of about thirty feet smoothly took the air. The controls worked perfectly. The "electronic rotor" worked powerfully and almost silently. Only the whirling of the propeller was noisy, but because it was mounted behind, and hence in the lee of the cabin, it was hardly annoying—certainly much less so, George reflected, than in the usual type of airplane.

At the end of the field George kicked over the rudder bar, shoved his joy stick to the side, and the plane banked over in a perfect turn. From then on it was a regular succession of turns; since the field was comparatively small, George amused himself by opening and closing the control switch. In a second he could jump from twenty miles an hour to sixty; then, closing the switch, the speed of the plane would drop until the plane would go into a stall, from which it could be pulled in no time by opening the switch. It was a wonderful experience for a pilot used to flying the ordinary type of machine. George was thoroughly elated. He wondered how fast he would go if he could keep the throttle wide open for ten minutes.

From time to time he swooped low over the heads of the group of watchers, leaning out of the cabin to answer their waves and shouting to acknowledge their cheers. After about twenty minutes he noticed that Rosselyn was emerging from the ranch house—he had apparently gone in without George's noticing—accompanied by the figure of an old man with extremely round shoulders.

"I'll guarantee that's Tonnerway!" said George to himself. "Wonder if he's satisfied now?"

Deliberately setting out to impress the old capitalist, George summoned every resource of his pilot's skill, and put on a pretty exhibition of flying. After about fifteen minutes he shut off his control switch, and drifted down to a perfect landing. As he climbed out, the mechanics came rushing up, lifted him to their

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shoulders and staged a little triumphal procession around the field. When their enthusiasm had cooled a bit, George insisted on getting on his own feet. Then he ran to Rosselyn and Tonnerway, who had stood watching the scene with beaming faces.

Rosselyn held out his hand without a word, emotion and pride struggling within him for expression. After a choked delay, he turned to Tonnerway.

"There's a lad for you! He's our partner! I've decided to give him a full half of my share in the proceeds!"

George was so startled at this unexpected generosity, that he could only stare agape at Rosselyn. Tonnerway offered George his hand. To Rosselyn he said, "That's nonsense! I owe him at least as much as you do! Suppose we divide everything three ways, each of us to get an equal share?"

"There's really no need of you to reduce your share," said Rosselyn. "But in any case I'm sure you won't be the loser in the end."

Then they all shook hands and walked arm in arm to the ranch house. All this time George had said not a word. It was impossible for him to speak. He was too overcome with happiness at all his good fortune.

TEN minutes later Tonnerway had flown off in his great touring aërocar. Rosselyn immediately began explaining to George the arrangements he had made with the capitalist for manufacturing the little Sologlane. Tonnerway had promised to deposit a large amount of money to Rosselyn's credit, so that work could be begun promptly. Within three months the first commercial Sologlans would be in the air, and then the world would be at their feet. Meanwhile it was necessary to arrange for getting a patent, and to prepare plans for erecting the manufacturing plant. Rosselyn radio-photographed New York.

"The lawyer promises to be here to-morrow afternoon," he announced. "And now, while we're waiting for him, let's get busy planning the factory and deciding on the stuff we'll need."

Until long after midnight the two stood at an improvised drafting-table, roughing out plans of needed buildings, calculating structural materials, and making up a schedule of required manpower. Before they went to bed Rosselyn radiographed Chicago.

They had just finished their drawings next day when the patent attorney, barely in advance of a thunder shower, winged his way down from the sky at three o'clock. At eight-thirty the next morning he took off on his return journey east. The intervening time had been spent by the three of them in feverish questioning, cross-examination and answering, during which time none of them enjoyed a moment's sleep. When the patent attorney left in the morning he had in his brief-case all the data he needed for a patent application. He was to stop off in Chicago and radio his data to his partner's office in Washington, and the partner was to file an application immediately.

George had been a little afraid that the attorney would balk at patenting a device which violated the Earth Preservation Law, but his fears were groundless. The lawyer took the news very calmly. "I knew that sooner or later some one would rediscover Nesbit's secret, and put it to constructive use," he said.

The words he used in the patent application seemed to describe something, but actually they were meaningless. The true process was carefully hidden away in a mass of new terms and phrases he invented, so that while each sentence was apparently clear in itself the whole was a meaningless jumble to any one not understanding the special meaning of the language used. The claims in the patent, however, revealed each step in Rosselyn's process. It was like the directions in a laboratory manual—all the ingredients and actions were catalogued, but no word of explanation given.

That day workmen began to arrive at the ranch, and Rosselyn put them to work at breaking ground for the building for his electronic rotors. As soon as the knocked-down structural units began to come in, they were set up. Within a week the factory was well on its way to completion.

Just as every one was returning to work after luncheon one day, a plane came in from the west and landed smartly just outside the canvas inclosure. Thinking it might be the installation engineer from the machine-tool manufacturer, Rosselyn and George stepped outside. They saw two young men climb out of the plane, one of them carrying a camera. In unison Rosselyn and George groaned. Reporters!

How had they heard the news? Rosselyn felt sure that Tonnerway had, in his enthusiasm,

let the story be known. George, however, felt instinctively that Greenfinch was to blame. His uncle had probably told him.

The newspaper men obviously had no real clue to what was going on, but they had an astonishing amount of false clues. It took the better part of an hour to placate them and send them away with a story that told nothing.

From then on life for Rosselyn and George was a series of irritations and annoyances—letters from cranks, inquiries from scientists, visitors all round the place, and planes snooping from overhead. The canvas wall had lost most of its usefulness. Yet in spite of the great interest displayed by the public, no one suspected the truth. The unfamiliar phrase electronic rotor served admirably as a screen.

FOR six hectic weeks this routine of hard work and constant watchfulness against interference continued. Then—

It was about five o'clock on the afternoon of July 13. George was checking a shipment of tungsten-steel tubing, completely engrossed in his work. Suddenly the air was alive with planes—far more planes than had ever before visited this remote spot in Montana. With a sickening sensation George recognized several police machines, easily known by their black color and the menacing turrets in which their guns were mounted.

Hastily pocketing his papers, George ran to warn Rosselyn. Before he reached the house, the police had broken through the gate and placed him under arrest. The attacking force consisted of a police lieutenant and ten officers. Five of the men were placed at strategic points with their weapons handy to keep in check the crowd which somehow had collected.

George was escorted indoors, and there Rosselyn was seated dejectedly, already under arrest. "You're both under arrest," announced the lieutenant. "The charge is violation of the Earth Preservation Law. It's something to do with this newfangled plane of yours, or rather the motor of it."

Rosselyn had slumped in his chair, crushed by his blow. George, however, was at fighting pitch.

"Let's see your warrant!" he demanded. "You're going to be sorry you ever saw this place!"

The lieutenant smiled tolerantly. "Don't worry, young feller," he said, "I've got the warrant right here in my pocket. I'll show it to you some other time."

"At least tell me who swore out the warrant, will you?"

The lieutenant shrugged his shoulders. "Can't think of his name. Sort of a heavy-set guy. He came over with us."

Just then there was a sound at the door. George turned to see who it was. His jaws clenched and his eyes blazed. Speaking in a barely audible voice, George pointed and asked, "Is that the man?"

"Sure," said the lieutenant, "that's the guy." It was Greenfinch.

CHAPTER FIVE

Benefactor of His Race

FOR two weeks, George Meaker and Julius Rosselyn were kept in jail. Bail was refused on the ground that the charge was too serious, and that their public appearance would surely cause a riot and bloodshed. It was still widely believed that anyone who broke the Earth Preservation Law was an enemy of society—that he must be bent upon destroying the world and every person in it.

For safety's sake, the first examination of the two prisoners was secret, and held in the dead of night. George and Rosselyn were brought before a justice of the Supreme Court, to whom additional powers had been given, and who was supported by a special grand jury of leading scientists. Even though there was great suspicion of scientists, in those days, the world could not get along without them. Now they came from their laboratories, all over America; hard-jowled, cold-eyed men, who were clearly aware of the great importance of this trial.

Any spectator in that strange and secret courtroom must have regarded Rosselyn as an arch-criminal. His appearance was clearly against him. His beard was a two weeks' stubble, his face was sunken and lined, and his clothes hung more loosely than ever on his gaunt frame.

Standing before the bar, steadying himself with both hands on the railing, he gazed with an air of defiance at judge and jury. The presence of the scientists seemed to have aroused him. George could see that his spirit was far from broken. He replied to ordinary questions about his name, age, occupation and residence in tones that were not cowed, but that rang clearly through the room. Then he was asked to make a statement of his intentions.

And he did. His statement was the main thing they wanted to hear. Later they would question him,—so the justice announced,—but now they wanted merely to hear what sort of defense could be advanced by a man who had been accused of breaking the Earth Preservation Law; accused, as they saw it, of plotting to blow up the world.

There was no need for the government attorney to outline the case. It was too clear. Everyone in the room knew about Nesbit's disastrous experiment; and by his own confession, just after arrest, Rosselyn had admitted that he had found Nesbit's secret formulas and had worked along the same lines. This confession, needless to say, had not been made public. No jail would have been strong enough, in that case, to save Rosselyn from the fury of the mob.

"You ask for my defense," began Rosselyn, in a low voice. "I shall tell you my motive; and then you will be free to make any investigation you please. The only thing that interests me is complete vindication. If you find that my motives are wrong, life will no longer be worth living. I should be put to death at once—and I should welcome such an outcome. But my motives were not wrong.

"I admit, first of all, that I have found out how to create energy by what is known to scientists as atomic disintegration. Those are long words, Your Honor, but the scientists in this room understand them. If I may translate them into plain words, so that all will understand them, I will say that this process is like throwing a lighted torch into a cask of gunpowder. All the grains of gunpowder blaze into one terrific explosion. In just such a way, the scientist who disintegrates the atom strives to turn every tiny atom into a bombshell! The force of one atom is nothing, provided it could be released without impinging upon the atom next to it. But the neighboring atom impinges upon its neighbor, and so on—until, in a space no bigger than a pin-point, millions of tiny bombs go off together and ignite their neighbors until the whole of creation is in one giant blaze!

"But—" Rosselyn paused, and looked around the room from one face to another. All the faces were bent upon him, coldly, cruelly, like the faces of torturers in some old-time dungeon. In another moment, their verdict would be expressed in one great roar; only the presence of the black-robed justice on the bench restrained them. And his face was stern, as if he were waiting only for the conclusion of Rosselyn's defense to condemn the victim to death.

"But," said Rosselyn, calmly, "every force in this world is dangerous until you know how to harness it. Benjamin Franklin brought the terrific high potentiality of the thunder-storm down to his fingers, on a kite line. Nobody now would repeat that early experiment. It should not be repeated. We have learned how to harness electricity, to make it safe, to make it obedient. We insulate ourselves from its destructive force and make it boil coffee and run fans and washing-machines in our homes. We aren't afraid of it, any more. We don't even hide our heads during thunder-storms, as our forefathers used to do. Think how the ocean appeared to the first man who paddled out, far from shore, on a log! Think of the danger of boiling water and of steam, before men learned to make boilers and pipes so strong that they could not be exploded. Think of the evil power of gunpowder, and of the high explosives that were evolved from it. The world in these days has learned how to get along without war, and we use dynamite only for blasting, saving the labor of thousands of men. I am speaking in simple terms, Your Honor, and if my brother scientists in this room were not so terrified by a force which they do not yet understand they would regard me as a brother and not as an enemy."

The justice looked around the room. His face had lightened a little, during Rosselyn's remarks; once or twice he had nodded, or seemed to nod. George Meaker's heart took a great leap. Perhaps—perhaps Rosselyn would somehow escape the wrath of the men who, without hearing his defense, had so evidently doomed him to death.

BUT George's joy was premature. No member of that grand jury seemed to be in any way influenced by what Rosselyn was saying. These men had made up their minds. The defense, the plea for mercy, the confession of the criminal, would not change their minds. And when, a little later, Rosselyn's speech was ended, on the same quiet note on which it had begun, the foreman of the jury—a doctor of chemical engineering named Francis—asked permission of the justice to say a word.

The word which he promised soon developed into a long speech, and the other members of the jury agreed with it heartily, showing their agreement by nods of their heads. "And so," said Doctor Francis, in conclusion, "we are not

influenced by the childish defense which we have just heard. The accused has *not* made use of ordinary forces, which can be harnessed. By his own confession he has tampered with forces which can set the whole of creation into one giant blaze. Those were his own words. He has unleashed a force which can destroy our world, and its neighboring world, the moon, together with the center of its system, the sun, and all its sister planets and their moons. And this is not all! This force can destroy not only our solar system but *all* the stars we see in the heavens, millions of them, stretching out through the ether until they are lost to our sight in the great nebulae and the mysterious clusters that compose the Milky Way. *This* is the crime which Mr. Rosselyn has confessed. *This* is the reason why we must condemn him to be put to death at once—even before he leaves this room!"

From all the other scientists on that jury, rose a deep-throated hum of approval. Some of them cried "Yes!" or "I agree!" Others simply made strange noises in their throats, as difficult to put in words as the roar of animals scenting prey. Not only their scientific principles were at stake in that strange trial, but also their humanity. They believed themselves to be the defenders of the human race, and of all creation so far as human eyes can see.

No wonder they howled for Rosselyn's blood. No wonder their rage and horror would also condemn George Meaker, Rosselyn's assistant, to instant and ignominious death.

Only the deeply felt reverence for a Supreme Court justice and for the usual process of law prevented these learned men from leaping out of their seats like wolves unchained, or like members of the mob in the French Revolution, who tore their enemies limb from limb in the streets. And in that hush, before the tempest broke—before these chemists and engineers could rise—Rosselyn spoke again.

"Don't you," he said, coolly, "want to see my apparatus before you destroy me?"

"If we can see it without risk," said the justice.

"Risk!" Rosselyn's tone was full of contempt. "If there is risk," he went on, "it is shared by my assistant and myself. In fact, we will take all the risks. You have but to look out of the window. I came here without counsel to defend me. And my counsel is not a barrister at law, but a patent attorney. If you will call A-715-BC on the univox radio, he will demonstrate my invention to you."

"No!" came the rasping voice of Doctor Francis. But the justice overruled him.

"I see no reason for an attorney to wreck himself, in the process of wrecking the world," said the justice, dryly. "If we can have a demonstration at the risk of the accused men and their attorney, I rule that we have it at once."

A court officer went out and spoke through the radio. Soon one of his assistants announced that Mr. Fleming, an attorney from Washington, would demonstrate the Soloplane in five minutes' time. Rosselyn and George were led, under heavy guard, from the room. The justice and the jury followed them and took places on a balcony overlooking the deserted square in front of the courthouse.

Four minutes went by, and then a fifth, and a sixth.

"In the name of science," rasped Doctor Francis, "I protest."

"But I rule that the experiment shall proceed," said the justice, looking out over the square. A lunch wagon, with all its windows dark and its customers gone, was the only vehicle there. There were no passers-by. It was long past midnight; soon, in fact, it would be dawn.

Then, as suddenly as a moth flies into the beams of an electric light, and as silently, a small, flitting object rose from the street behind the lunch wagon, and maneuvered in the air. It could be seen clearly in the glow of the street lights. It was the Soloplane!

At an altitude of twenty feet, Fleming changed the angle of the propeller, and the little plane flitted straight toward the balcony. Francis ducked his head; the other scientists gave back. Only Rosselyn and George stood fast; and then, at the last instant, the Soloplane swerved to one side, like a darting swallow, and zoomed upward till it was out of sight above the cornice of the courthouse.

Only the faint drone of its motor and whirr of its propeller could be heard, and when these sounds faded Rosselyn's voice came with a vigor that startled the justice and the jury.

"That is my invention," he said.

Before the words were out of his mouth, the tiny plane was in sight again, dropping slowly through the air. Five feet above the concrete pavement, Fleming gave the propeller a little extra speed, and the Soloplane hovered for a second like a hummingbird over a vine. Then it was down—down without a jar—down without running forward a foot! In spite of

[CONTINUED ON PAGE 98]

What is a "Phantom" Telephone Circuit?

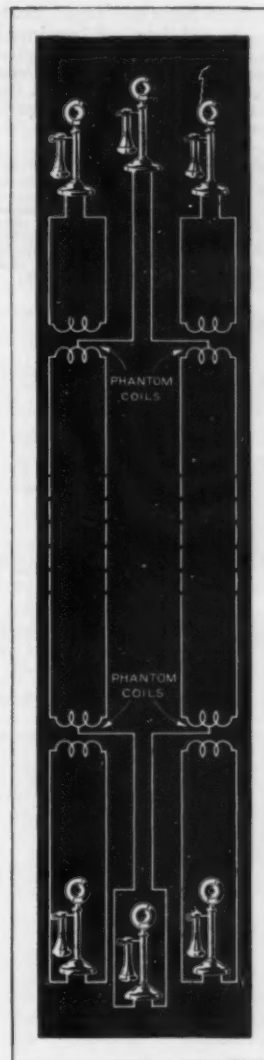
An Advertisement of the American Telephone and Telegraph Company

WHEN you talk over the Bell System long distance wires you are very likely to be talking over a "phantom" circuit. Whether you are or not would not be known to you, for the voice over a phantom circuit is just as clear as over any other kind. But the phantom circuit makes it possible for two pairs of wires to do the work of three.

The ordinary circuit is made up of two wires and the current flows around them. Two of these circuits, with four wires, will of course carry two conversations. By means of phantom coils a channel for a third conversation is made out of these same two circuits.

Each of the two circuits is cut into three parts (as in the diagram) and reconnected at the ends by phantom coils. These are a type of transformer. Each part then acts exactly as though it had not been altered. But together they make up a phantom circuit, arranged as indicated in the diagram. Half the circuit in this third or phantom circuit flows over one pair of wires, half over the other.

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themselves, some of the scientists clapped their hands at this marvel. Back in the courtroom, the justice spoke a few words.

"This investigation stands adjourned," he said. "The court and jury will proceed to the defendant's laboratory at Sunnerdin, Montana. Speaking as a layman, I cannot believe that the force which drives the wonderful little airplane we have just seen is a force which could have evil effects upon this world, the moon, the sun, and the planets!"

Rosselyn and George spent that night at a hotel, in custody of detectives, but not exposed to the hardships of a cell.

"Wasn't Fleming wonderful?" said George. "I don't want to hurt your feelings as the pioneer," answered Rosselyn, "but anybody with ordinary intelligence can fly the Soloplane. When we get our scientific friends to Montana—he smiled sardonically at the word "friends"—we will give them a chance to fly the little plane themselves."

THE demonstration at Sunnerdin ended within a week—and ended in the purchase of a Soloplane by every member of that hostile jury, even Doctor Francis.

"Why," said that unbelieving scientist, all smiles now, "this little plane will enable me to fly in five minutes from my laboratory to my club, and from my club to my house—right over the traffic in the city streets. And it will land on any flat roof anywhere. Thank fortune, I built my house in the Spanish style!"

"A good many houses are going to be built with flat roofs from now on," predicted George Meaker. "But even if you have a peaked roof, you can come down in the smallest back yard."

"I said years ago that the helicopter principle was the right one," said Doctor Francis. "All we've needed was a sufficiently powerful motor."

Rosselyn grinned. "I'm sort of glad," he said, "that you didn't put me to death before I left that room, back East. Scientists always look with contempt at one another's little devices, before they understand them—but I did think, Francis, that you were going pretty far."

"I didn't understand your principle," grunted Francis.

"Do you now?" "I think so," Francis shuffled a pile of papers and blue-prints on the desk. "I see that you manage to isolate one atom from his neighbor just far enough to prevent the neighbor from exploding too soon. That's what Nesbit didn't understand. Nesbit set off an explosion that covered several hundred square miles of territory. You set off an explosion that covers about one square millimeter! And all around that millimeter is a safety zone of negative insulation—is that what you call it?"

"What difference does it make what I call it," said Rosselyn, "provided it works?"

"But the possibilities of this invention are marvelous," insisted Francis. "You've applied it only to a small motor—only three hundred horsepower. To run that motor for an hour, you explode the atoms in a bit of matter as large as the head of a pin. Suppose you built a really big motor—if the proportion holds true, you could get five hundred thousand horsepower out of the atoms in matter as large as a brick."

"Suppose," said Rosselyn, abruptly, "we all go in to lunch. No, Francis, I don't want to be rude to you. You howled for my blood, just as the ignorant men of the seventeenth century howled for the blood of Galileo, when he invented the telescope and said the world was round. You can't blame me for feeling just a little sore. Galileo proved that his devilish apparatus was only a bit of glass and a wooden tube. The world has built big telescopes since then. Anybody who wants to build a big motor can do so by getting a license under my patents."

"And I wonder," said George Meaker, suddenly, "just what this cheap and mighty power will do for the world?"

"I leave you to wonder," said Rosselyn. "Just now I'm wondering how to build these little Soloplanes efficiently, and how to sell them in the same way."

"I can tell you!"

This interruption came so unexpectedly that it made them all jump. It came in a voice that George instantly recognized—the dry, creaking voice of old Mr. Tonnerway.

"Just drop all that nonsense about calling this thing by such jaw-breaking words as 'Soloplane' or 'Monohomo Car,'" he advised. "Public won't stand for them. What were the early automobiles that made the real hit? All had simple names, like Ford, or Buick, or Dodge, or Chrysler. Big fancy names are no good. Get something that will tickle the public mind. This plane hovers in the air just like a mosquito, or a fly. Why don't you call it the Fly?"

"Flies aren't so very popular," said George Meaker. "Besides, puns are out of date. They'd

THE ROSSELYN EXPERIMENT

(CONTINUED FROM PAGE 97)

think we were trying to make a pun. Fly in the Fly!"

"That's a pretty good slogan," said Mr. Tonnerway. "That would sell airplanes, I do believe. What better name would you suggest, young man?"

"Well," said George, "it's such a graceful flyer, and it holds itself so steady in the air, that I—I'd call it the Hummingbird Car."

"That's good, that's good," chuckled Mr. Tonnerway. "That's a name that will take! Catchy! But why 'car'? Why don't you call it a plane?"

"People are still just a little bit scared of planes," said George. "You see, the first airplanes really did plane; and before ailerons were properly designed, and safety slits were cut in the wings in the right places, there were so many accidents that the word 'plane' still scares the ordinary man and woman. Now this new machine is for sale to everybody, and—"

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"Good! I like to hear you talk that way. Universal market, eh? Everybody to have his own plane—I mean, car. Father to have one to go to work. Mother to have one to go marketing, or to the club meeting. Sister and brother each to have one to go to school—and maybe to the movies, once in a while. Good! We'll sell two hundred million of these Hummingbirds, or my name's not Tonnerway!"

Late that evening, a passenger plane came in from the East and dropped, not merely a score of reporters, but a heavily muffled figure that stood in the background and listened while Rosselyn gave the reporters a meat supper and treated them as if they were long-lost brothers of his own. All need for secrecy had gone. The more news that these men could print the better for Rosselyn, and for the world. All that night radio instruments hummed, sending out full details to the two great newspapers, and early in the morning direct transmission started for the radiophones in every American home. Magazine editors were beginning to drop in now: Mr. Malcolm, representing the powerful Atlantic-International group, with its periodicals in every land; Mr. Donald, eager to get equally exclusive articles and telephotographs for his great group, headed by the World Magazine.

Meanwhile, one figure skulked on the outskirts of the group, almost as if he did not wish to be recognized at all. But the bright, birdlike eye of Mr. Tonnerway soon discovered him.

"A fine mess you've made of things," said the capitalist. "If I'd listened to you, I should have lost all my money—and Mr. Rosselyn came mighty near losing his life, as it was."

It was Greenfinch. He glowered sullenly. George Meaker felt a sudden and strong desire to lay his hand on a radio heat gun, and treat Greenfinch to a blast from it. But this impulse passed, and he gripped Greenfinch firmly by one elbow, while old Tonnerway took him by the other. They marched him off to find Rosselyn, who was sitting in his dressing-gown and slippers on the ranch-house porch, snatching a few minutes of rest. When he recognized Greenfinch, he rose with a singularly charming smile.

"It's my former assistant, whom I didn't find very good at assisting," he exclaimed. "You

pretty nearly put my head in the noose, too. But you couldn't, of course. The Hummingbird Car was able to speak for me, just in time."

"If there's any way I can—" began Greenfinch. "I know what a bad mistake I made. If there's anything I can do—"

"You want a job, do you?" said Rosselyn.

"He will want one," broke in Tonnerway.

"He's out of a job with me."

Greenfinch turned white. These words meant that his easy employment with his rich uncle was all over. He had come to mend his fences, as well as he could. Now he was out of work. And he was not a bit confident that he could find any other work that would pay him nearly so well, or have such short and easy hours.

"I suppose—I suppose I do need a job," he said at last.

"Well," said Rosselyn, "I don't bear malice long. A few days ago I'd have been pleased if you had broken your neck. Today I'm at peace with the world—and I'll show it by giving you some work. If you will take that pick and shovel you see on the end of the porch, and report to Mr. Muldowney, in charge of a gang of men working behind the barn, he'll put you on the payroll at ten dollars a day. If you do well there, we might promote you to the selling force—some time when we have a selling force. What do you say?"

Greenfinch gulped, and looked around desperately.

"Better take that offer," said old Tonnerway, dryly. "You'll never get another penny from me."

MANY years have passed since the remarkable events which I have tried to describe. The Hummingbird Car has been improved so greatly that the people who use it now would hardly recognize Rosselyn's first crude model—the little model that George Meaker flew in Montana, and that Fleming used to save its inventor's life. Hummingbirds are as thick as snowflakes, almost, in the air. Everybody has one, just as Mr. Tonnerway predicted. They have done all that Rosselyn ever hoped they would—and even more.

The Hummingbird is now wonderfully compact. It has its electric generator mounted upon the propeller shaft, so that the electronic rotor turns both the propeller and the armature. This furnishes ample current for the little electric-lighting circuit of the car, and for an electric heater in its cabin, which is now entirely inclosed. It also recharges the battery for supplying the high-frequency tube, in circuit with which is the electronic rotor, whose energy cycle is applied to the propeller shaft. Most people, of course, don't care about these details. They are satisfied to know that the little car really does fly, winter or summer, rain or shine!

Only a few physicians shake their heads over the fact that there is so little walking left upon the earth. But people are now playing games, far more than they ever did in the old days; you see grandmother out on the golf course every morning; you see the whole enrollment of a high school or college playing newball—the successor of football—every afternoon. And when it rains, the games are played in huge buildings, lighted by radio current, that are so large they make the baseball cages of former times look like huts!

So life adjusts itself to progress, and Rosselyn will always be remembered as a benefactor of his race. Nobody goes plodding along the streets any more; no pedestrians dodge automobiles at every crossing. The world has taken to the air. And the great sea of atmosphere over our heads is so large that, up to now, there is plenty of room for all. Even when a collision occurs among the Hummingbirds, George Meaker's invention of the earth-current damper brings a crippled car as softly as a snowflake to the ground.

George Meaker himself walks very little on the street; he is the champion newgolf player at his country club, and he has not followed the example of some of the old men, who don't walk after the balls any more but use Hummingbirds even there. In fact, he is going to ask the committee to pass a rule against this practice, because newgolf should be exercise as well as a game. And there is one bit of walking which George performs faithfully, almost every day. He walks to the house next door to call upon his old friend Julius Rosselyn, who sits on the piazza every evening dreaming of the great new technical city of Texantic, into which he is going to put all the ten-billion-dollar fortune he has won from the Hummingbird Car.

Texantic will be a city unlike any other in the world. It will be a sort of paradise on earth for scientists and inventors, where they can live together and work out their problems without disturbance from the rest of human creation.

THE END

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ALEXANDRA IV.

(CONTINUED FROM PAGE 84)

wagon with a crate in it, standing in front of a meat market at a distance of two hundred yards, perhaps, ahead. Three men, one in a white frock, stood talking.

"There they are!" the Old Squire muttered. "We may have a rumpus with them!" The old gentleman reversed the butt of the whipstock—by way of preparedness.

But no rumpus occurred. One of the men, turning suddenly and seeing us approaching, jumped into the wagon, followed instantly by another of the three. Whereupon, lashing their horse, they departed at a gallop, leaving the one in the white frock staring after them in evident astonishment. He was still looking in their direction as we drove up, but turned to us in much bewilderment.

"Did those men have a large calf with white markings in that crate?" I asked.

"Yes, they did," was the reply. "They wanted to sell it to me for veal, and I was just goin' to pay them eight dollars for it."

We waited to hear no more, but gave chase again.

"Veal!" the Old Squire cried. "Seven hundred and fifty dollars going for veal!"

On the chance of circumventing them I rushed into the telegraph office and sent two messages, one to the Crawford House at the head of the Notch, the other to Fabyan's. I didn't stop to count my words, but said, "If a veal calf is offered you today, don't purchase. It is a stolen animal."

I ran back to our panting team, and by the Old Squire's advice we took the road leading to Jackson.

"Wentworth's Pavilion is much nearer than the hotels up the Notch, and that old horse of theirs cannot hold out much longer."

ROBINSON C. ROUSSEAU

(CONTINUED FROM PAGE 77)

You see, he just wanted to be rough—back to nature—away back! That kind of broke down my softness towards him, even if he *did* need a nurse. If he wanted to taste life with the bark on—well, I'd let him have a good nibble of it.

We fetched my island ten days later, in the middle of the night. Mr. Crousseau was in his bunk, sleepin'. But I'd trained the crew carefully, and each man knew his duty. By good luck, there was a thunderstorm comin' up, and the ground swell was breakin' on the beach. At a signal the whole crew started runnin' and stampin' on the deck, with whoopin' and yellin'; and when the owner came up in his fur suit—I guess he'd been sleepin' in it—one man let go the fore halyards, and the boom and sail went overboard in a big mess.

That heeled the schooner over to a most convinclin' angle, and the crew was yellin' like a crowd of crazy Indians—as I'd told 'em to. Mr. Crousseau teetered around, gettin' in everybody's way, and yellin' at the top of his lungs, "Be calm, my lads, be calm."

A terrific crash of thunder helped things along, and the lightnin' couldn't have been better if I'd had it measured to order.

"To the rafts!" I hollered in Mr. Crousseau's ear. "Every man for himself!"

"The hour is here!" screamed Mr. Crousseau, and jumped onto the raft as if it had been an elevator. The lightnin' cracked again—and Mr. Crousseau sat down hard. He recovered his voice and shrieked, "Heave ho, my lads!"

I gave the signal, and six of the lads picked up raft, castaway, etc., and started to sling the load overboard. I yelled a partin' message in Mr. Crousseau's ear. "There's provisions and everything you'll need aboard the raft—if you get ashore alive. Good luck!"

We got him down, and the lads gave him a shove in the right direction. He certainly had courage, that man—or else he was so crazy about adventure that he wasn't seein' things straight. The last I saw of him, he was headin' for shore on his raft, as fast as a passenger on a roller coaster at an amusement park.

MY instructions were to cruise back in two and a half months. But the farther I got away the less I liked it. Why, that office man would be a regular babe in the woods. He couldn't freeze, of course; and I had given him enough canned grub for a year. But could he build a hut? Could he make a fire?

So after a week-end in Jacksonville, I cruised back to the island again. My heart did a handspring as I saw a tattered shirt on a pole. A signal of distress!

I put the dinghy over and pulled in. No sign of anybody about. Over under a sand

At no great distance up the road to Jackson, there was a sawmill on the rapids of Ellis River. High piles of boards rose on both sides of the road, but mostly on the north side. Suddenly as we were driving past we heard a calf bleat long and loud from somewhere in among those stacks of lumber. The Old Squire cupped his best ear with his hand.

"Pull up!" he exclaimed. "I believe that's our calf!"

Less than fifty feet from the highway we came upon Alexandra IV in her crate, on the ground behind the lumber. Greeting impromptu weapons, we peered cautiously about, but discovered nothing of the thieves or their team. They had hidden the calf there and gone on, plainly with the expectation of our continuing the pursuit without finding her—when they might return later to recover their prize. At least that was what we now concluded. But they had failed to count on the calf's vocal accomplishments. She was hungry and was calling aloud for her accustomed milk, which she had not had since early that morning. But for her loud outcry, we should most likely have passed on and perhaps missed recovering her altogether.

Of course as good citizens we ought to have continued the chase and made an effort to bring the miscreants to justice. But night was at hand. Our horses were fatigued and in need of food and water. I have to record that all we did was—very thankfully—to reload crate and calf in our wagon and proceed back to North Conway, Alexandra IV enlivening the way with several more of her boisterous demands for sustenance. She little realized how narrowly she had escaped becoming veal, and how fortunate had been her dissonant blatting.

dune, I saw some planks from the raft leanin' crazy together as if somebody'd tried to build a shelter. I went back for three men, and we beached the dinghy near the dune. On goin' ashore, we heard moans. In a jiffy we had the boards away—and there lay Mr. Crousseau, as disreputable a sight as I ever saw.

He was dirty, and a week's beard was on his mosquito-bitten face. Mosquito bites were all over him, and the sand-fleas had been busy, too. The goatskin was charred and in tatters—and the poor fellow was sunburned as red as a lobster from head to foot.

"Hello, Mr. Crousseau," I hailed. "How did you make out?"

"Never mention that name to me again," he groaned. "Oh, what a time! What a dreadful experience!"

"But everything's all right now," I said, kindly. "Your man Saturday is down at low-water mark, makin' footprints in the sand! As soon as you see those footprints, your heart will leap up—same as Robinson Crusoe's did!"

"Get me on the ship," snapped Mr. Crousseau. "Do you think I want one colored boy? What I want is a hospital, and a day and a night nurse, and some good food."

That evenin', while we were cruisin' northward under full sail, he had recovered enough to answer questions. It seems he couldn't build a fire—the only thing that would catch was his own clothes! And the hut fell down on him. And he was half starvin', havin' lived exclusively on crackers and water.

"I forgot to bring the can-opener," he explained. "Such a little thing! The lack of a ten-cent contrivance completely demoralized the success of a glorious adventure."

That was a fair sample of this man who wanted to live next to nature! We asked him where he wanted to go next.

"Home!" he said, from his bunk.

"Aye, aye, sir," I said. "But I thought you wanted to go to a hospital."

"No," said Mr. Crousseau. "I want to go home for a special reason. I want to burn a book in my library. I want to sit in front of a cheery fireplace, and tear the book to pieces, page by page, and throw the pieces into the fire. The name of the book is—"

"Rob—"

"Don't say it!" he yelled.

Captain Pen chuckled. "He was a funny one! He let a day-dream get the best of him. He calls himself Mr. R. Chumley Rousseau, now. Yes, sir, notions often land us in strange places, and things in real life ain't what they seem in books!"

"It's the truth!" chuckled Napoleon, the parrot, swinging happily in his cage.

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A picture taken during the filming of "Old Ironsides." At the left George Bancroft, in the center Mr. A. G. Smith of Smith Brothers, at the right Wallace Beery. Courtesy Paramount Pictures.

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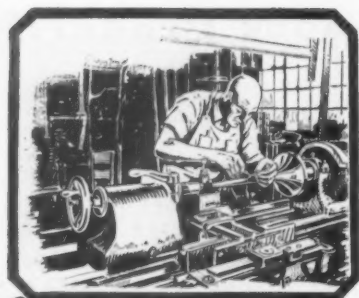
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He told her more, laughing. "It seems to me," he added, "that you've got some shore leanings, for a deep-water girl."

Victory looked momentarily annoyed and shrugged her shoulders. "My ma was a landswoman," she admitted. She moved away from him down the deck and vanished with the suddenness that seemed easy to her. Rod turned to see Messrs. Crowder and Hubbard strolling towards him. They stopped at some distance from him and began staring at him up and down, and then nodded several times.

"I hope you're pleased with my appearance," he remarked. "You didn't even give me time to pack up a clean shirt when you invited me aboard, you know."

"None of that, now," Hubbard growled. "We've told you before we don't mean you no harm, if you keep your mouth shut. And by the time you get home we'll be where it won't matter to us what you spill."

"Oh, I'm going home then, am I?" inquired Rod with interest.

"Sure, sure!" Crowder hastened to put in. "You don't seem to get us. We aren't kidnapping you or anything. What in blazes'd we want you for? It's just like Mr. Hubbard says—just so you won't have no chance to talk till we're ready."

"I only wish I knew," thought Rod, "what there is to talk about!"

ALL this time the Miraflores had been pounding away northward. She had met big liners coming out from Halifax—keen-built ships, trim with smart paint and bright brass, and crowded with summer tourists who lounged to the rail to watch the battered tramp rolling astern. Rod had become, if not pleased with his quarters, at least used to them, and could sleep in moderate peace within that airless cubicle, nor even wake when Jan flung a sea-boot at Miguel to make him stop snoring. Jan was an enormous Swede, who, when he was sober, was disposed to be friendly toward Rod.

"What you ban comin' mit us for? You say you ban shanghaied, ain't it? I know better as dat!" He opened his large pink mouth beneath his golden moustache in a silent laugh.

"Then you know better than I do," Rod grinned. "I'm like ballast—just going where I'm put, because I haven't any say in the matter."

"Huh! Huh!" said Jan with a shrug. "You wanna come in by de clean-up, same as us. You ban smart kid. You got dose guys scare, ain't it? You ban peek at dose sparklers, ain't it? I know—I know!" He nodded his great yellow head, grinning foolishly.

Rod, impatient and annoyed, went up to get some air before turning in. He would need a good supply stored up, for Miguel always chewed his good-night garlic, which, he insisted, was "good for da stom." Rod, on the dark deck, puzzled over Jan's words. Why in the world did everyone take it for granted that he was so much more informed than he really was? Sparklers conveyed nothing to him but an image of the small fireworks one sets off on Fourth of July, and he had certainly not had a "peek" at anything at all. He gave himself up to the glory of being on a ship at sea—at night. The darkness was intense; most of the stars were veiled, and only the largest shone dimly through high fog clouds. A mysterious quiet held everything; the only sounds were the secret hiss of the water away from the Miraflores' sides, and the muffled beat of her engines. That day the Miraflores had passed an iceberg, a mammoth prism, dipping its way lazily southward.

As Rod leaned at the rail now, watching the wake spread and shift and fade astern, dim in the dark, he was suddenly aware that someone had approached on noiseless bare feet and was standing at his elbow. It was Victory—a shadowy, formless figure, with only the faint shape of her face glowing in the gloom.

"I had to come and tell you," she whispered furtively. "I didn't know just what this job was about before—but now I do. You say you don't, and I believe you. I peeked through my door crack and saw 'em—Crowder and Hubbard—looking at 'em. Sparklers! Millions of 'em, I guess."

"Sparklers again! 'I don't understand,'" Rod frowned.

"Di'monds," she breathed. "Don't you know what di'monds are? Other things, too, but mostly all sparklers. Those guys must have made a big clean-up, all right. Now do you understand everything? I never saw anybody your age that was so thick. I kinda like it, somehow—most of 'em knows too much. But still—"

Rodney understood everything, however—everything except what was to be done with himself. Oh, how great it would be if he could only manage to frustrate these crooks somehow—just like a lad in a book! Small chance he'd have! Crowder and Hubbard would see to that, right enough. Books always left such

LUBBER'S LUCK

[CONTINUED FROM PAGE 80]

surprising loopholes by which young heroes might escape to do daring deeds single-handed. He laughed hollowly.

"It's funny, ain't it," Victory remarked. "There's I don't know how many squillion dollars' worth of stuff in there—and here's all of us about two jumps from the poorhouse. That is, I dunno about you, but I do know about me. Of course Pop'll get his slice, but Lord only knows what he does with it."

"See here," Rod said, "I don't understand you. Doesn't it ever occur to you that, if I'm in the enemy party, and if I ever do get back where I can make trouble, I could make plenty for your pop as well as for those other two?"

Victory peered up at him from beneath her mop of hair. "But you wouldn't," she said. "He does rotten things, and I know some of his jobs ain't quite on the level—but you know how you feel about your ma."

"I can't see that that has anything to do with it," Rodney said.

"He's my pop, though, same as she's your ma," the girl explained.

"You're pretty charitable to him."

"Oh, well," said Vick, "he's always given me somewhere to sleep and enough to eat."

Rod shook his head. "Well, I'm going to turn in," he said. "Thanks for the news."

What made her give it to him, he wondered! She had not been so free with information the first time he had seen her. And what was he to do with this fact now he had it? The nature of the men's crime was settled, that was all. It was certainly unlikely that he should be able to get access to the gems, or if he did it was still more unlikely that he could escape with them from a ship at sea. And even supposing he could, he would run considerable risk of being taken up for the thief himself! What a queer outfit this was, anyway! Apparently everybody on board was "in" to a certain extent on the traffic in hand. Of course they all got some sort of handsome bonus; that was what kept their mouths shut in port.

Rod would have liked to see the whole crowd get their deserts, and the poor old Miraflores restored to honor and decency as an innocent freighter. But there was Victory—it wasn't really her fault. No, certainly not her fault at all. Her mother had struggled to keep her ashore. Had that landswoman lived, the girl's life would surely have been very different. As it was, her instincts were extraordinarily decent—even her loyalty to that dish-faced pirate, her father. What a rotten life for a girl—among these dirty, foul-mouthed men, on this shabby tramp!

Rod cautiously opened the door of his cabin. Jan was snoring extravagantly, a forbidden bottle protruding from under his gray pillow. Miguel's garlic was too much. Rod sought the deck again, propped himself in the lee of a cargo hatch, and fell asleep with the fog in his face.

NEXT day the landfall was distinctly nearer. Newfoundland, this must be. Rod encountered Rankin, directing a perfunctory washing-down of decks. The Miraflores received little attention of this sort.

Answers to Questions

[See page 90]

1. Ohio—Harrison (W. H.), Hayes, Garfield, McKinley, Taft, Harding.
2. Six—Harrison (W. H.), Taylor, Lincoln, Garfield, McKinley, Harding.
3. Washington, Monroe, Jackson, Harrison (W. H.), Taylor, Pierce, Grant, Hayes, Garfield, Harrison (B.), McKinley, Roosevelt.
4. James Buchanan.
5. Grover Cleveland.
6. John Adams, Jefferson, Van Buren, Tyler, Fillmore, Johnson, Arthur, Roosevelt, Coolidge.
7. John Quincy Adams.
8. Zachary Taylor, U. S. Grant.
9. Washington, Jefferson, Madison, Monroe, Harrison (W. H.), Tyler, Wilson.
10. Grant, Hayes, Garfield, Harrison (B.), McKinley, Taft, Harding.
11. Hayes.
12. Thomas Jefferson.
13. W. H. Harrison, Theodore Roosevelt.
14. Taft.
15. Grant, Hayes, Garfield, Harrison (B.), McKinley.
16. Thomas Jefferson, John Adams.
17. Washington, Jefferson, Madison, Monroe, Jackson, Lincoln, Grant, Cleveland, McKinley, Wilson.
18. Andrew Johnson.
19. Wilson.
20. Grant.
21. Roosevelt.
22. Washington, Monroe (second term).
23. Lincoln was shot in Ford's Theater, Washington; Garfield was shot in the Pennsylvania Railroad Station, Washington; McKinley was shot at Buffalo, while attending the exposition there.
24. Washington presided, Madison was among the leaders on the floor of the convention.
25. Calvin Coolidge.

"We're not running in, are we?" Rod asked.

"Where is this, anyway?"

"St. John's," said Rankin, spewing out a generous spurt of tobacco-juice on the deck, on purpose to annoy the swabber, who had just washed down that section. "Looms up clear this mornin', don't she?"

"We're a lot closer to land than we were yesterday," Rod observed. "What're we trying to do?"

To himself, he wondered what on earth a landing here would mean. The crooks would have little opportunity to dispose of stolen gems in this desolate place! He was a-tingle with strange sensations; the mystery, the life at sea, the knowledge that, concealed on this ship, were perhaps a million dollars' worth of diamonds, speculation on what his own part in it all was to be, combined to fire him almost to the combustion point.

By late afternoon it was evident that the Miraflores was deliberately approaching land. More and more definitely it asserted itself on her port side—a forbidding land of steeply ascending evergreen forests and long, in-reaching bays and inlets. The ship slackened to half speed and crawled inward, feeling her way. Captain Brisbane, on the bridge, shouted and cursed and yanked on the engine-room signal. Crowder and Hubbard stood at the rail, talking quietly. Every now and then one or the other would burst out in a nervous laugh of satisfaction. Behind them all, Victory hovered, puzzled and anxious, pushing her hair away from troubled eyes and gazing now at the two men, now at Rodney. Plainly she was on fire to speak to him and dared not with all these enemy eyes watching. This ship had approached as near as was possible to a little harbor, where could be discerned some shacks built in little clearings, and a sort of precarious pier that straggled out into the water. Beside this were moored some rough fishing-boats, and bark and skin canoes were pulled high up on the beach. When the last engine-room signal had tingled to silence, and the Miraflores lay at peace, throbbing faintly, Crowder turned suddenly to Rod.

"Well, here you are!" he said hastily. "Hope you've enjoyed the trip. Sorry you can't go with us all the way. This is Kip's Arm Island, where you'll be able to get some interestin' local color till you get off."

Rod, inarticulate with amazement and anger, stared from Crowder to the boat that was being lowered over the side. Rankin was in it, grinning up at him. He felt himself suddenly pushed from behind.

"Come on now—Cap'n ban waitin'."

It was Jan, and other hands were gathered near, swinging their big arms menacingly. It was useless to struggle. Rod faced them all for a minute. He tried to think of something biting to say and, failing utterly, decided it was better anyway to keep a dignified silence. So he put his chin up and looked at Victory. She turned away—whether from sorrow or shame or scorn, he did not know. He suspected her suddenly of being no friend after all—of having betrayed his confidence. He looked at her no longer, but climbed over the side with dignity. He was just as he had been when he had left Joe Bent's hayfield,—except distinctly dirtier,—and he still had those few dollars in his pocket. In his bewilderment and his simplicity, it never occurred to him that it was quite within his rights to demand a large bonus himself—damages, or hush-money, or whatever he might please to call it.

Jan and Rankin rowed the boat. "You sure surprise me," Jan remarked. "I t'ink you ban in on dis. Dis ban one time I miss my guess, ain't it?"

"You shut up, Jan," growled Rankin, "or it'll be one time you miss your slice. There's getting to be too much talking on this ship. And all these here side jobs, like settin' lubbers ashore in a rotten little hole like this. The Old Man's clean cracked to bring the tub in here—it's a wonder he didn't try to fetch her up beside this here wharf while he was about it."

Rankin growled, and Jan laughed his wide foolish laugh, and Rod sat huddled in the stern-sheets, looking with growing anxiety and distaste at the small remote island. A group of wild, unkempt children had assembled on the shore, and as the boat's keel grated on the shingle they scattered like sandpipers. Rod stepped out, numbly.

"Say," cried Jan suddenly, "dey might give de kid yoose a coat at least. It ban cold up here, ain't it?"

He stripped off his own and tossed it to the boy.

"Thanks," said Rod, overwhelmed by a fierce, disproportionate gratitude for this small mercy. "Thank you very much!"

Then the boat pushed off for the Miraflores again, and Rod was alone, a castaway, on the barren shore of Kip's Arm Island.

[TO BE CONTINUED NEXT MONTH]

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SPORT

[CONTINUED FROM PAGE 89]

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[CONTINUED FROM PAGE 89]

to take the loose man. But if No. 5 were covered, No. 1 could hook-pass to No. 2, who broke to his left side; or he could do a front turn and pass to No. 3.

A Surprise Play from Center

It is good to have a surprise or trick play to use at some strategic moment of the game. But too many of these plays, or the same one tried too often, will weaken your system of play, because trick plays are weak in some department.

Here is one that Indiana teams have used with success. The center must be tall and have enough jumping ability to get the tip. Just as the ball is tossed up, the two forwards move to one side of the floor. This leaves the other side of the floor open. The guard on that side drives forward. The center has tapped the ball, caught it, and then made (after one step backward) a two-hand overhead pass to the guard who has evaded the defense and is waiting under the basket.

Winston, former All-Conference center, was the man most instrumental in the success of this play. Beckner, high point man in the conference, 1926, was an ideal man for such a play, which requires speed, and quick-starting ability. If the guard is covered, the center can pass to either of the forwards.

know them but adopt them without a second's delay, no matter how close the game. Look for such players. They will regain possession of the ball, even though they have no set type of defense. But men who lack the fundamentals will easily be beaten, even though they are letter-perfect in formation drill.



Principles of Out-of-Bounds Basketball Plays

NINE out of ten basketball lives that have the ball out-of-bounds follow the same principle in returning it to a teammate on the floor. When the play is near the basket the purpose is to score. To illustrate this principle let us assume that No. 1 has the ball out-of-bounds near the basket. He is guarded by opponent A. His teammates No. 2 and No. 3 assume the positions shown. They will be guarded from the basket side by opponents B and C.

No. 3 rushes around No. 2, who remains standing, grazing just by him at full speed for the basket. This quick move prevents his opponent C from following No. 3. Consequently No. 3 gets a good lead on C. As he comes to the basket he receives a high pass from No. 1 and immediately shoots. S. M.

Diet for February

THE purpose of training rules should be to form our habits for the future. To violate them is more than mere physical departure. It is the tendency to cheat which may later lead to grief, morally. Some athletes do well in spite of wide violations of training. They might do better in the present, and assuredly would better fit themselves for the future, by observing proper rules of health.

When I read those words in a book, "You and Basketball," by Dr. H. C. Carlson, coach of the undefeated University of Pittsburgh basketball team of last year—a record accomplishment on the court—I decided to talk with the author about the methods of training he used to bring about his signal success. Here's what he had to say on this question:

"Our Pitt team was made of boys like myself who had to fight to get an education. I think their willingness to struggle for it is one reason why they fought so keenly for athletic victories. As to our diet—well, most of the players commuted, and a training table was impossible. Only on trips did I have full say about what to eat.

"The diet I recommend for basketball players, and for that matter for any boys who participate in a strenuous sport, is one that will most quickly restore energy and at the same time build up their growing bodies. To this end plenty of carbohydrates in the first instance and proteins for the other.

"I'm not averse to the players eating candy, as its caloric value is high. This helps in the generation of energy. Along this line it is interesting to note that Hyatt, our wonder forward, ate 'Life-savers' practically all the time.

"When the season was well under way I tried to have plenty of sweet milk to compensate for the wear and tear of practice and games. I think every boy should go heavy on milk. When we were on trips I saw to it that the boys got good meat as proteins to build up the body. They generally had a small steak about three hours before each game." S. M.

The Stronger Your Defense The More You Can Attack

[CONTINUED FROM PAGE 89]

their own men—the men they played opposite to, on the tap. If this succeeds, each defense player continues to cover his own man and play him, man to man, over the whole offensive half of the court. But if No. 2's man, for instance, slips past him unnoticed, he will be picked off by either No. 4 or No. 5, and No. 2 will then take the first open man he sees. He does not search around for No. 4's man, but takes the first open man. If Nos. 1, 2 and 3 retreat with their men, Nos. 4 and 5 advance to the center of the court. But they are safety men, and under no circumstances should they let a free man cut past them.

To single out one type of defense and say it is the best is to admit ignorance of basketball, because the game is played under very different conditions as regards both men and courts. It is the writer's opinion that under average court conditions, and with average material, the man-to-man type of defense has more to recommend it than the others. But there is little to choose between it and the two-line, man-to-man defense. However, flexibility is a great advantage. If your opponents are ahead and are attempting to hold the ball in the back court, the players in the plain man-to-man defense simply advance, and each picks off his own man. Covering your own man results in closer guarding; and if a man gets free, there is less passing the buck of responsibility.

The two-line zone defense is especially adapted to small courts, and to players lacking in the fundamentals of defense. When the zone each man has to cover is small, this defense works very well. But in this day of large courts it is asking too much of the men to instruct them to play the ball entirely. This particular defense offers no protection at all against a good, moderately long shot; the opponent stands off and throws it over your heads. But when working with very young players, or if the players are tired and winded, this defense will tend to keep the score down.

The four-man type of defense presents the attractive feature already noted; your team may get a chance to strike offensively at any moment. But this advantage is more apparent than real if the opposing team has a good five-man offense, against which it is almost impossible to form a tight defense of four men. If your opponents are constantly scoring, the fact that you have a man lingering in their side of the court is far less of a help than a hindrance.

Let it be stated that any sound plan of defense rests on the ability of each player to master the fundamentals of defense. Mr. Metzger's drawing on page 89 is worth study. There are men who have instinctive ability on defense; they seem to know the methods illustrated, even before they are coached—and they not only



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NOW YOU TELL ONE

The Companion will pay \$1.00 for each original joke that is accepted for this column. Only the best of the thousands that are sent us can be used and paid for. We can not undertake to return those that are not accepted.

DOT'S A PIG YOKE

"WE are now," announced the guide, "passing through a rural hamlet."
"Oh!" exclaimed the lady tourist. "I thought a hamlet was a little pig." —Eleanor Nestor



NOT THEIR MAKE

DIFFICULT CUSTOMER: "I can't remember the name of the car I want. I think it starts with 'T'."
Exasperated Salesman: "Madam, all our cars start with gasoline." —Virginia Moore

UNIVERSAL BY NEGLECT

"WHAT is Esperanto?"
"It's the universal language."
"And where is it spoken?"
"Nowhere." —Henry Robinson



INDEPENDENT

DOCTOR: "George, are you married?"
George: "No, suh, boss. Ah, makes my own living." —Estelle Rodgers

THE PROPRIETOR'S LAMENT

"SOME of the people who dine here," said the management sadly, "seem to regard our spoons and forks as a sort of medicine to be taken after meals." —Gwen Lax

MUST LOOK ELSEWHERE

TOURIST: "I've come here for the winter."
Californian: "Well, you've come to the wrong place. There's no winter here." —Ella Louise Jennings



WHY ASK?

STRANGER (at gate): "Is your mother at home?"
Youngster: "Say! Do you suppose I'm mowing this yard because the grass is long?" —Virginia Moore

SELF-DEFENSE

"If a man smashed a clock, could he be convicted for killing time?"
"Not if the clock struck first!" —Ella Louise Jennings

UNAPPROACHABLE

BILL: "What is the greatest modern acrobatic feat?"
Will: "Football, I guess."
Bill: "No. Wheeling West Virginia across the Ohio." —Walter E. Sprague

NUTS TO CRACK

A CORNER FOR BUSY MINDS

1. WORD-DIAMOND

1. A letter. 2. To cut short. 3. A catalyst. 4. Lawless persons. 5. A flower. 6. Flashed irregularly. 7. To scatter. 8. To cover with grass. 9. A letter.

2. TRIPLE ENIGMA

My first is a Hebrew month. And my second is. My third is a simple preposition. The whole means to leave.

My first is the same as the third above. My second is very sticky. My third is a mythological maiden. You will find the whole in Canada.

Take the maiden for my first. The second means eat. And the whole is an antiseptic.

What are the three interlocking words?

3. LETTER-CHANGING

1. SIGN 6. POST
2. **** 7. ****
3. **** 8. ****
4. **** 9. ****
5. **** 10. POST

It is possible to change SIGN to POST by changing one letter at a time and forming a new word at each change. It is necessary in the above solution to use one masculine proper name.

4. CONCEALED COUNTRIES

Off ran certain soldiers, painfully defeated. There was no time nor way for them to escape, although the boats on the river Po landed reinforcements. They had to agree certain facts were not true; that if Caesar played on a harp he could not call it a lyre; and that when a man was wed entering a temple he was not divorced leaving it.
The names of several European countries are concealed in this paragraph.

5. CIPHER MESSAGE

EHRUORMNEOTDTAD
If these letters be selected in proper order, in accordance with a certain rule, a message will be discovered. Best of all, the message will tell you where the key is.

6. MISSING WORDS

Though ***** secure, and ***** in its cage, Our Folly, when ***** will fly into a rage.

If the proper letters, six in number, are chosen, it will be possible to arrange them to form words which will fill in the three blank spaces.

7. WORD-DIAMOND

1. A letter. 2. To make firm. 3. A church council. 4. The act of starting over again. 5. Dragged. 6. A parent. 7. A letter.

8. ENIGMA

First, there was a vehicle. Second, it was in a South American city. Third, it was leased. Altogether, that makes a special kind of carriage.

9. DOUBLE WORD-SQUARE

1. A definite part. 2. A flat surface. 3. A famous king. 4. A great scientist. 5. An inhabitant of a small European country. 6. Again. 7. Certain evergreens.

10. MISSING WORDS

***** of mighty ships were ***** In ***** beneath the giant's sword.

The three missing words are each composed of the same six letters.

ANSWERS TO JANUARY PUZZLES

1. D. Met. Tapes. Magenta. Depending. Tenders. Stir. Ana. G. 2. Rapt. Part. Trap. 3. Hard-Tack. 4. Insert the letter I. "Sipping spirits is insipid, I insist." 5. 10 8 1 1010
3 1908 12 6
1911 2 7 9
5 11 1909 4
6. Gray Toques From Little Acorns Grow. "Great Oaks from Little Acorns Grow." 7. Thirteen. Neither. Entire. Nitre. Time. Tin. It. I. 8. May-Be. 9. Excess. Essex. (XS. SX.) 10. Fry. Egg. Fry. Try. Toy. Toe. Doe. Dye. Eye. Ere. Eng. Egg.

Taste the Juice of Real Mint Leaves



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Roses are red—
Violets blue—
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is good for you!
Wrigley Chewing Gum



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It would be difficult to find a more lifelike Baby Doll anywhere—regardless of price.

Baby "Smiles" is a real little aristocrat, a master creation of the doll-maker's art.

Her face is so pretty and vivacious. Her bright blue eyes just sparkle with mischief as they open and close, as well as move from side to side, with coquettish glances.

She carries, on a dainty ribbon, a miniature baby pacifier to soothe her when she cries.

Her cry is pleasant, plaintive and coaxing.

She is completely clothed including stockings, moccasins and honest-to-goodness rubber panties.

Baby "Smiles" is a big girl—seventeen inches high.

She clasps her hands in childish glee.

Her cunning little thumb just fits into her baby mouth.

She is completely clothed including stockings, moccasins and honest-to-goodness rubber panties.

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Her face is so pretty and vivacious. Her bright blue eyes just sparkle with mischief as they open and close, as well as move from side to side, with coquettish glances.

She cries with a pleasingly plaintive voice, but Baby "Smiles"—true to her name—is a well-behaved and lovable baby; she won't cry unless you want her to.

And when Baby "Smiles" arrives she'll be all dressed up in her "Sunday-go-to-meetings." From her dainty lace-trimmed hat to her ribbon-bedecked moccasins she looks the highbred aristocrat she really is.

Baby "Smiles" has life-like soft rubber arms and hands. She sucks her thumb, clasps her hands and holds her pacifier in her dainty rosebud lips. She's a darling and no mistake. The picture here—while attractive—does not begin to do Baby "Smiles" justice.



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In the January number of The Companion, from which these were taken, 99 advertisers offered their products for your consideration. And here were a few of the things they offered you free, and for no more labor on your part than using a pencil and pair of shears, and putting a stamp on an envelope—

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THE YOUTH'S COMPANION

8 Arlington Street, Boston, Mass.

UNDER THE ICE

[CONTINUED FROM PAGE 81]

great party-goer. He was an impulsive, humorous, bright-eyed boy, full of jokes and stunts—just the sort of boy who is popular everywhere. Now he had to tell a lot of ladies and girls that he couldn't go to their parties, after all.

The cuts soon healed, but still the two boys would not speak to each other. At table, they maintained a silence which was absolutely unlike their ordinary good spirits. David went without butter, or salt, or pepper, rather than ask Peter to pass anything. At the end of each evening, Peter left the room without a word to David.

"But I won't speak first," thought David. "He called me a liar, and he's got to apologize on his bended knees before I forgive him."

A LONG and smoldering quarrel it was! As the weeks went on, all David's and Peter's friends decided that these boys, once so friendly, had now become real enemies—enemies for life. And then fate took a hand.

Events began slowly and in a small way, just as the quarrel itself had begun. The junior class was playing the senior class at hockey, near North Bend on the Passaquam River. Peter was a regular on the junior team, being a fast skater with good poke-checking ability. David was only a substitute. He played for a few minutes, early in the last period, and then was excused. The shortest way home was across lots, but—for a reason that he couldn't explain afterward—he decided to skate down to North Bend, and try to get a lift home from there.

It was Peter that David thought about as he skated moodily downstream—so moodily that he didn't watch the ice ahead, and was startled when it cracked under his feet with a noise like a rifle shot. Then, as suddenly and unexpectedly as an event in a dream, he found himself splashing down into cold, deep water.

Instantly his mind cleared. There was a second of panic. Then he began to think fast and clearly. He had shut his mouth instinctively against the deadly inrush of water. He began to swim upward, taking fast and strong strokes. His skates made his feet feel heavy. But he knew the water was only ten feet deep in this place. The current was slow. Surely—surely—he would come up again in the hole through which he had fallen. Then his hands struck something rough and hard. And his upturned face followed and bumped into the ice—firm, unyielding, pitiless.

The blood began to sing in his ears. He knew that he must hold on to the air in his lungs. His instinct was to expel it in one great relieving outburst. But when that happened, it would be the end. His lungs heaved convulsively, striving to exhale the stale air which they now held. He locked the muscles in his throat and stared desperately upward through the ice. It was surprisingly luminous. On its surface he could see curved skate-marks. They traced bright, slender lines across the last sunlight he would ever see.

His strength was gone. One last exhausting effort, a frantic struggle to crack the unyielding ice with a blow from his fist, and then David drifted away from struggle and fear.

NOT three minutes after David Herrick left the game, Coach Britton excused Peter Dufour. It was only a practice game, of course, and Peter was playing far below his true worth. He was glad to see his substitute come in; and without stopping for a good-by to any

one he skated downstream in the direction David had gone. He did not know, of course, that his former friend was ahead of him; the river has many bends. Peter did not even know, or stop to think, why he was skating down it. He wanted, chiefly, to be alone.

Three hundred yards above North Bend, he saw a boy with a red muffler go through the ice. Instinctively, he rose on his toes for a quick start and leaped forward with all the speed he had failed to show in the game that afternoon.

But how—how—could Peter get a drowning man or boy out through the ice, thick in some places and thin in others? He was nearly at the scene of the accident when it occurred to him that, not fifty yards from the bank, was a woodshed belonging to a farmer named McKenzie. There was just a chance—well, better than a chance—that McKenzie's axe would be there.

Peter shot to the shore, ran inland on his skates to the woodshed, found the axe, and rushed back to the river with it.

He settled to the racing stroke his hockey playing had given him—that short, running stroke which wastes no time on grace, but takes every ounce of push and strength.

Ten more strokes—eight more—there, on a line with the tree—two more—careful—both feet—stop left side—faster that way—scrape, scrape—a-a-a-a-ape! Steady now! Now!

A hard blow. Axe up again. Whang, whang, whang! At the third stroke, the thin ice buckled, and water splashed. Deep, booming cracks radiated out from the blade of the axe. Two inches of ice—barely enough to hold a skater, but so thick, so hard, so relentless when a man is dying underneath it. At Peter's fifth stroke, a piece broke. At the seventh, down went Peter in a hole of his own making.

And then, Peter Dufour pulled the limp body to the surface and looked into David Herrick's face!

HELP came, slowly at first, rapidly afterward. Two small boys appeared from nowhere and helped Peter to drag David out of water scarcely four feet deep at the bar. Then, also from nowhere, came Mr. McKenzie; and his arms carried David to the McKenzie's parlor. And then people, called by telephone, began to drive cars into the yard. And there was a pulmotor, and a doctor to run it.

David's face was limp and motionless, and his eyes were glazed—but his chest began to heave, and the blood started running again in his veins, and when an hour had gone by he was fully conscious and able to look up into Peter's face.

"You were hoping for a deadly encounter," said Peter, softly. "How do I know? I heard you mumbling about it at night, many a time. Well, David, I guess we've had it all right."

"Peter—boy!" said David, and that is all he said at the moment, because the doctor very properly chased Peter out of the room.

But the two boys were speaking again! There was no reference, at any time, to the long month when they didn't speak. Yes, there was—but it wasn't really a reference in so many words. It consisted merely of a solemn Christmas presentation of a large, English-made knife with fifty blades and other accessories, by David to Peter, and a first-rate, Bridgeport-made machete, complete with scabbard, by Peter to David.

David also has an old and battered axe, which he begged from Mr. McKenzie.

TONY HAZARD CLIMBS THE WALL

[CONTINUED FROM PAGE 73]

should decide to talk to Tony—should suggest his going back? That would give him an opening."

"I think," said Joan slowly, "that you'd better keep up that wall and let Tony climb it himself."

Tony tackled the wall in his own characteristic fashion. That evening, as soon as the business friends had left, he walked into his father's library. "Dad," he said, "I need some kind of expert advice, and I guess maybe a lawyer would be best."

"Lawyers are called upon in most emergencies," said Tony's father. "You might—er—state your trouble."

"I made a business contract, and now I see that I can't carry it out. The best thing is to stop right now."

"Any good reason why you shouldn't keep on as you promised?"

"Two," said Tony calmly. "I can sell the chicken houses and the incubator now, at a very slight loss, to a man in Wardsville, who came today to ask where I bought them. And natu-

rally the sooner I get back to school the better."

"Sure of that?"

"Yes, sir—if you're willing to send me, and they'll have me again."

"What's the idea?"

"I don't know yet, Dad. Something that I've learned to do, after I'm old enough to have more judgment in choosing."

"That's—reasonable. How about chickens?"

"In the morning, after I've arranged with Mother, I'll go and try to sell them—alive—to Mr. Sippy's market."

"**J**OANI!" Ann burst into Deepdene's sitting-room next morning. "Dad's gone to New York. He left you a cheque for four times eighteen dollars, plus a hundred bonus. He says a contingent fee is always at least double the other kind."

An hour later Tony arrived. "Say," he announced eagerly, "I've sold those darned hens at a profit, if you can believe it, and gone out of business. And, Joan, that's a mean slogan of yours, but it's jolly well true. Work is work!"

GUARD'S BACK

[CONTINUED FROM PAGE 75]

were close to the goal, when one of them would attempt to shoot it into the net, or hoop. It was edifying to me, this discovery that the game possessed a method, a science all its own, and I studied the contrasting systems closely.

You will understand all this, of course, for you have seen basketball contests. I emphasize it, because it is the key to the solution of the battle. Jordan smashed and scurried up and down the floor and scored now and then, Putnam, playing a seemingly cooler, more deliberate game, also scored often. Byers, I should say here, appeared to me to be the most frenzied, the most determined and active, in all the Jordan attacks. He was the center of every group rolling and bouncing down the floor. At the end of the first half, or period, Jordan was slightly in the lead. My recollection is that the score at this point stood seventeen for Jordan to fourteen for Putnam.

But Byers was quite apparently used up. He was pitted against the Putnam back guard, a veritable giant, who used most uncouth tactics in repulsing Jimmy at all times. It seemed to me that every time the referee was not looking this rough fellow thrust his elbow into Jimmy's mouth, or tripped him, or shoved him to the floor. I know I became very indignant at one point when Byers fell over this back guard's foot and landed upon his head, cutting his forehead and making it bleed. The action was deliberate on the back guard's part, I assure you, so plainly so that I could not refrain from rising off the bench and shouting at the referee:

"Robber, robber! Are you blind?"

But my voice was lost in the uproar.

"They'll be out to get us, next half," warned Coach Lennox, when we were in our dressing-room. "We'll have to be on our toes to hold this lead. And we need a reserve punch. Byers, you lay out and hug the bench, starting this half. Smithson, take his forward. They'll fight like fools, and so must we."

I was glad to note that Byers would have a rest, which he sorely needed, although I was apprehensive as to our effectiveness without him. He seemed to be the keystone of our game, or, rather, the inspiration or driving force of it. But he was so cut and bruised I did not see how he could play another moment, even if an emergency arose in which he should have to fight again.

In five minutes, however, as I writhed and squirmed on the bench beside Byers, who twisted and turned in agony, the Putnam team gratified the prayers of their supporters. They jumped into a speedy, decisive offensive, won the tip-off several times in a row, and thrust the ball down the floor with great skill and speed. Before the period was more than a third gone, they had turned the tables and taken control of the contest, more surely than we had controlled it in the first half. The score stood 21 to 18, and we were the lower dog!

At this juncture the rushing, slashing tactics of Putnam ceased, and they abandoned their zone and man-to-man defense. Instead, they ranged their team so that the back guard, Swenson, stood below and before his basket, and his team-mates formed in front of him in stout semicircle. When we obtained the ball, they organized themselves thus and defied us to come down the floor and attempt to break through that wall. They made no attempt to get the ball, but waited. Our boys must either shoot at the goal from far out on the floor, or scale that stubborn defense.

"Coach, is that fair? That waiting method?" I asked, indignantly. But Coach Lennox ignored me as completely as if I were some unknown freshman.

"Byers, in there, quick," he ordered. "For Smithson. Smash that ball down the floor! Break down that defense. Five men in the attack. Quick!"

Byers jerked off his sweat shirt and ran out on the floor, signaling the referee. Smithson came out, and in a jiffy the game changed back into a smashing, grinding battle. I cannot give you the scientific details, beyond saying that the Putnam defense was described to me afterward as being the Michigan idea for meeting a four- or five-man offense. We got the ball and went smashing down. They fouled, and Wilkins shot the goal, once. We fouled, and they countered. Presently we broke through and made a field goal. A moment later they retaliated, with a long and lucky shot.

It was the nip and tuck, charge and counter-charge. Byers, with Moore and Wilkins right with him, fought like a demon. But every time we scored Putnam came right back at us, restored her lead and resumed that brick-wall defense in front of Swenson and the goal. The crowd was in a constant uproar, and my heart never beat so fast. Besides the excitement of the game, there

was my resentment of the giant Swenson's tactics against Byers to keep me on nervous edge. He was forever roughing the little fellow, and Byers was always hard put to restrain his temper. Even I could see that.

Finally, with only about two minutes left to play, the ultimate crisis of the contest arrived, with my nervous system verily exhausted. I had been forced to relax, to abandon the effort to keep myself keyed up to the terrific struggle. We obtained the ball, and with Byers leading, went smashing and crashing, flipping and passing down the floor. Every pass was challenged. Every receiver was smothered almost the instant he received the ball. But we kept it until, just under the basket, Swenson blocked Byers savagely and batted the ball out of bounds. Byers fell to the floor and took time out, although the referee refused to call a foul. During the short time out, I could see Byers whispering to Moore.

PLAY resumed. Byers was ordered to bring in the ball. Swenson stood in front of him, waving his arms frantically to block a pass. Every Jordan man was covered, or guarded closely. Then, just as his time expired, Byers shouted:

"Moore!"

Moore charged stoutly away from his opponent, headed directly toward Swenson, and at the same instant Byers bounced the ball down on the floor under Swenson's arm. Moore scooped it up on the run, and flipped it into the air. It was a miracle of chance—but the ball came down through the hoop! Putnam rooters gasped in dismay. The score stood, Putnam 25, Jordan 24. Once more my heart leaped, and I fairly trembled in my excitement. Putnam rooters screamed for a stout defense. I could hardly bear to watch the game, for I surely could not see another such clever play, which would win for us. I looked about and noticed Coach Lennox. He wore a faint smile. I looked at Byers and saw determination all over his features.

"Oh, for one moment's use of Penn's powerful old guards-back," I muttered to myself, wishing to crush that stubborn Putnam stone wall.

Up went the ball, and up went the rival centers. Wilkins, leaping his utmost, tipped the ball down and backward to Moore. Down came Moore, bouncing the ball a few steps. He tossed it to Wilkins, and Wilkins, in full stride, batted it back to him out of the reach of their respective Putnam guards. The two teams collided, virtually head on, and there was a maddening terrific scramble. Seconds to play. All ten men fought like tigers. And then, suddenly, Byers encountered the rogue Swenson under the basket. They crashed together, Byers fell, and the ball rolled out of bounds. The same situation, again! Will the same play work? I wished they would try something else, for surely Putnam would not be fooled twice, in the same place, the same way, in the same moment.

My heart sank. The boys were trying the same trick! "Moore!" screamed Byers, frantically. Again Moore charged in. But this time Swenson was too smart; he wheeled about to block Moore, and—but, no, no! It is Byers, Byers! With every Jordan mate covered, and Moore facing Swenson, Byers cannot pass—but he does! He shoots the ball, *hard*, against Swenson's shoulder blades. It drops to the floor behind Swenson; Byers pounces on it, snatches it up and with one motion, before he can be smothered, has it swirling and twirling up into the air, where it rolls and twists around the iron ring—to drop through for the deciding point, and the game!

I thought my head had burst from sheer excitement, but it was only the firing of the pistol by the timekeeper, ending the terrible struggle. It seemed ages before my heart and pulse were back to normal. I came to, in the dressing-room and gathered that Byers had invented, on the spur of the moment, in the crisis, an entirely new play! Coach Lennox had asked him something.

"Oh, Dean was talking about that old guards-back play," grinned Byers, sheepishly, "and there was Swenson's back, big as a brick wall! I just did it, that's all."

"And how!" shouted Wilkins.

"Dean's our official mascot, from now on," yelled Moore.

I blushed, like a schoolboy, and have accepted the honor, although I fear my heart will not stand the strain. Yes, I wrote to Mr. Allison and described the resourcefulness Byers exhibited, with some gratification. He was pleased, too, but when he replied, "That's railroadng." I wrote to him again. Remembering my excitement, I said:

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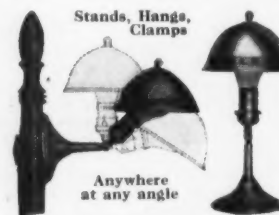
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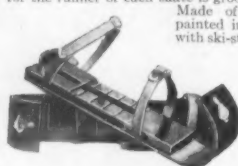


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all the appliances of the Indian magicians, it is simply made.

The ball is sometimes of metal; on other occasions, a coconut shell is drilled to serve the purpose. It is hollow, and so is the mast upon which it is mounted. Both the ball and the mast are filled with water before the trick is performed.

The boat is also filled with water, above the level of the thwart, and therefore above the bottom of the mast. No water can issue from the small hole in the side of the ball, because there is no inlet for the air to take its place.

There is a tiny hole in the side of the boat, through which water trickles very slowly. This is not observed, because there is a puddle of water on the ground, below the boat. Because of the leakage, the water level of the bunder boat sinks very slowly. The moment that it has imperceptibly reached the bottom of the mast, air is admitted and a jet of water comes from the hole in the side of the ball.

The stream of water is greater than the slow leakage. It pours into the boat, and raises the water level to the bottom of the mast. The stream ceases instantly, but begins again, a few moments later, because of the further leakage of the boat.

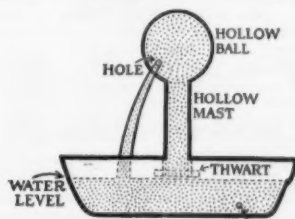
The fakir has studied this apparatus, and he has no difficulty in timing his commands to the exact instant. Apparently the hubble-bubble is obeying his orders; in reality, he is following its actions and doing it with the skill in timing that comes of long practice.

This is one of the cleverest feats of the street fakirs. It has been seen by many visitors to Calcutta, but few of them have solved its secret.

Dancing Duck and Shooting Arrow

The Dancing Duck frequently follows the Hubble-Bubble. The fakir utilizes a small bowl, or the half of a large coconut. The bowl is filled with water. Then the fakir sets it on the ground and drops in a tiny wooden duck, which floats on the surface.

The magician seats himself several feet away and beats a small drum. As he sways back and forth to the rhythm, the duck suddenly dives



A diagram of the Hubble-Bubble trick described on this page

beneath the surface of the water. At the magician's command, it bobs up again. The duck dances about the bowl and seems imbued with life. The exhibition continues for several minutes, until finally the fakir captures the duck and empties the bowl.

The simplicity of the articles is misleading. Some of the people expect to find a marvelous mechanical duck, but the little figure is nothing but a chunk of wood. The motive power for its actions is furnished by a long horse-hair, which is attached to the duck. The hair passes through a hole in the bowl, and the fakir has possession of the other end.

While he beats upon the drum he controls the actions of the duck by means of the invisible hair. The swaying of his body gives him plenty of opportunity to make the duck bob up and down.

In filling the bowl, the magician spills water around it, so the slight leakage from the hole is not noticed. This is similar to the procedure in the Hubble-Bubble.

One of the most surprising feats of native magic that I witnessed was the Shooting Arrow, or Magic Marksman. Here the fakir had a little image, barely a foot in height, with a crude left arm that projected from its shoulder. The end of the arm supported a bow, and here the fakir inserted an arrow. When the end of the arrow was pressed back into the right shoulder of the effigy, the arrow took the place of the right arm, which was missing, and the bow-string was drawn taut.

An upright stick, several feet away, served as a target. When the fakir had arranged everything, he stood back, waited and then commanded the image to shoot the arrow. The bow flew without an instant's hesitation. I saw this trick performed many times, and in no instance did the arrow fail to reach the mark.

The effect was quite startling, and the fakirs performed the trick very cleverly. The secret

MAKING MAGIC

(CONTINUED FROM PAGE 85)



Howard Thurston, the great magician who wrote this article for you, with his daughter

lay in the socket which received the end of the arrow. This socket was filled with sticky wax. When the fakir drew back the bow-string, and pressed the arrow firmly in the socket, it would remain there for a short time. When the pressure of the bow-string succeeded in counteracting the adhesion of the wax, the arrow was suddenly released.

Here, again, the fakir was clever in his timing. He knew by experience the exact instant that the release would take place; and his sharp command invariably came just at the moment the arrow was discharged.

A friend of mine who recently visited India brought back a story of a remarkable mystery in which a fakir built a fire upon a boy's head. This was heralded as a veritable miracle of Oriental magic.

He told how a fakir placed a hollow cylinder upon a boy's head, filled the cylinder with fuel, poured oil upon it and then set fire to the whole mass. The boy stood there with the flames rising above him; yet when the ordeal was concluded he was quite uninjured. The cylinder was thoroughly examined; and it was found to be free from trickery.

When I was in India I saw the very trick which my friend described. It was not performed frequently, but I observed it more than once, and photographed it on one occasion. The description is not exaggerated. The tube is set upon the boy's head and is held there by a sort of turban. The fire is actually built in the cylinder, and it burns furiously for several minutes.

If the person who told of this mystery had examined the cylinder very closely, he would have noticed a slight inward bulge in the center of the tube—a sort of ring set within the cylinder. Perhaps he did notice it and took it to be a mere peculiarity in the construction of the tube; but in reality it was there for a very important purpose.

When the magician set the tube in its proper position, he put rags and small twigs into it; and with them he inserted a metal disk which fitted loosely in the cylinder. Hidden in the rags, the disk passed unnoticed. The ring in the cylinder stopped the disk, however, and the result was a barrier dividing the tube into two sections—upper and lower.

The fire was built in the upper section, and the flames could not harm the boy in the least, despite their height. After the blaze was extinguished, the fakir carefully unwound the turban, showing the cylinder intact. When he poured the ashes on the ground, the disk fell with them, unnoticed.

During such an exhibition I have seen a boy scream and pretend that he was going through great agony. This made the whole performance very realistic, and the spectators frequently feared for the safety of the boy.

I have explained several of the typical tricks of the Hindu fakir; and these give a good idea of the usual program. Some of the native magicians are skilled in sleight-of-hand, but they are limited in their repertoire. When I returned from India, I brought back one of the best magicians of that country, who was named Bella Hassan. Upon the stage, his program was very limited, for only a few of his tricks were suited to the new conditions, and it was necessary to devise some additional experiments to lengthen his repertoire. Strangely enough, the part of Bella Hassan's performance which most fascinated the audience was not his magic, but the winding of his turban, which he did with great dexterity in the Hindu fashion.

Besides the magicians of India, I saw many street entertainers, who performed skillful feats of juggling, acrobatics, and tricks with trained

animals. Then there were the snake-charmers, who handled the cobras very cleverly, but whose ability, like that of the fakirs, was greatly exaggerated.

The Elusive Rope Trick

There was one mystery of India that I was especially anxious to see. That was the rope trick, a strange fantasy in which the fakir is supposed to toss a coil of rope in the air, where it remains suspended. Then, the story goes, a boy climbs the rope and disappears. The fakir climbs after him, and vanishes also.

Quite a few people have claimed to have seen this astounding mystery; but no magician who has been to India has ever seen it, although all of them have searched for it. I spent a great deal of effort trying to find the rope trick, but without success.

In Calcutta I gave a special entertainment for the magicians and street entertainers. At the conclusion of my performance I asked if any of them had seen the rope trick, but I could not discover one who had even heard of it. Although I saw many tricks which the average traveler never witnesses, I could find no trace of this elusive rope mystery.

Some people claim that the trick is actually performed through the aid of hypnotism, which places all the spectators beneath the magician's magnetic control so that they imagine they are seeing the fabulous miracle. This story cannot be given credence; first, because group hypnotism is an impossibility; second, because any fakir who possessed such a marvelous power would use it in the performance of equally impossible mysteries—but no others have been recorded.

The only rope trick that I saw was performed with a short piece of rope that the fakir balanced on his hand. The rope remained rigid, but when it fell to the ground it coiled. This was accomplished with a rope that had a thin wire in the center. It could be made rigid, but would support no weight. When it fell to the ground, the force of the blow caused it to coil.

Some persons claim that fakirs have used a peculiar rope, made of jointed pieces of bamboo, which can be made to stand upright, like a pole, and thus sustain the weight of a boy. This does not sound practicable, and it does not account for the disappearance of the boy.

Yet still we hear stories of the rope trick—performed in the mountain regions—on the deck of a ship—in the courtyard of a hotel—and other places; but the exact time and place are never stated, and actual witnesses are as impossible to find as the trick itself! Audiences, you see, often help magicians, as, far from being skeptical, they claim for him powers which he does not claim himself. What psychologists are just finding out about what they call "suggestibility" we magicians have known for years.

Upon my return to America, I began experiments to see if I could produce the effect of a boy disappearing from a suspended rope, in the center of a lighted stage. For a long while my efforts were in vain; but I finally succeeded in devising an illusion that resembled the famous rope trick of India.

Many difficulties were encountered, and improvements were necessary. Now at last, the illusion works smoothly. But its success is due to the application of the ingenious methods of modern magical stage-craft, and not through the aid of any mysterious talisman from India. And it can be performed only on a carefully prepared stage.

I am glad to note that The Youth's Companion publishes "The Best Trick of the Month" in every issue; for making magic is skillful business. It develops dexterity, resourcefulness and quick wits. Many boys I know are extremely competent amateur magicians. And boy assistants, because of their size, their skill, quickness and physical agility, are almost invaluable to me in the performance of some of my illusions.

Magic is deception, it is true. But it is not only harmless deception; it is deception that is amusing and stimulating to its subjects. There is no reader of this magazine for whom it has not supplied many amusing hours. I commend the study of magic to you; and I challenge you, the next time you visit the performance of a master magician, to see how many of his tricks you can discover from the hints that I have given you in this article.



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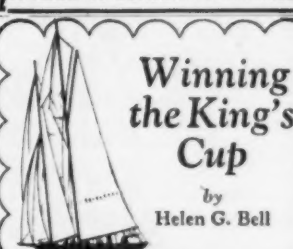
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HOW TO MAKE A BICYCLE SLED

Easy and speedy winter transportation available now to every Lab Member

BICYCLES are not much use in winter. Sleds are in their element, but their big disadvantage is that they possess no motive power of their own. Out of a sled and an old bicycle, however, any ingenious Member of the Y. C. Lab can with little effort construct the means of winter transportation which combine all the thrills of coasting with the fun of being your own engineer and motive power.

Two bicycle wheels, each with inflated tires, are used to supply traction. They are wound with wire to provide a better grip and to prevent slipping. They are mounted on the ends of an iron rod, offset in the middle to form a crank. This rod is supported over the middle of the sled by two pivoted arms, and two stout bands of rubber keep the wheels constantly in pressure contact with the ice, the pivoted arms readily allowing for any irregularities in the surface. Guiding the sled is easily accomplished by raising one wheel slightly above the ice, while the crank is turned forward or backward to force the other wheel to steer the sled in the direction you desire.

The illustrations show a top view and a side view of the assembled bicycle sled and details

By Dale R. Van Horn
COUNCILOR, Y. C. LAB

tion. There will then be no danger of blistering your hands when operating the crankshaft.

Be sure that, after bending, the rod is straight and true, for if one end is a little out of line with the other the wheels will not turn easily. If at all possible, bend the rod at a forge on an anvil. Heating the spots to be bent will help you to make the desired shape quickly and save you a good deal of work. (Before you shape the rod, be sure that it will form a tight fit in the hubs of the bicycle wheels. If it is only slightly oversized, the ends can be ground down to fit.)

Now fasten the wooden arms to the front of the sled with $\frac{1}{4}$ -inch bolts which have washers on each side to prevent cutting into the wood. The arms should slide smoothly up and down without much friction, although they do not need to be too loose. Before drawing these bolts tight, slip the iron rod through them into place.

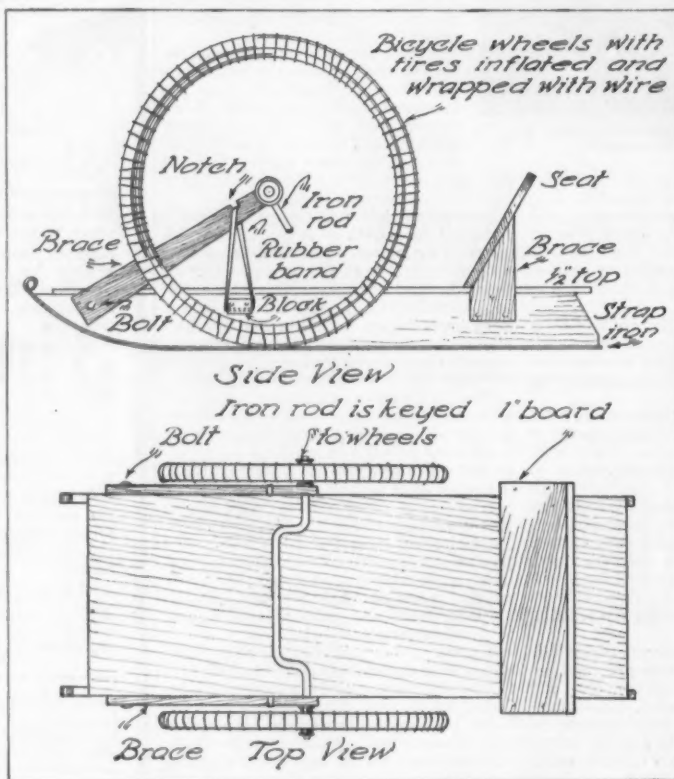
To fasten the bicycle wheels in place, roughen the end of the rod slightly and place a paper washer next to the hub on one side. Then pour melted solder into the hub to hold it tight. You can, if you wish, pour from both sides. You will find it advisable to use two front bicycle wheels rather than a front and a rear.

The bands of rubber can be either 1-inch sections cut from a large truck inner-tube or strips from an ordinary tube, the ends of which are later fastened to the side of the sled with wooden blocks and screws as shown in the drawings. In either event they should provide a strong downward pull—so strong that until you sit on the sled the front end will be off the ice. If either wheel wobbles as it turns, bend it back until it runs true.

The seat consists of a wide board for the back rest, and two triangular braces nailed or screwed to the sides of the sled as shown. Be sure to place the seat at such a distance that you can operate the crank in comfort.

Spare time for a few days only should be sufficient for the entire construction of the bicycle sled once the materials are at hand. Once it is completed, the ingenious Lab Member will have an easy and speedy means of transportation that will be the envy of his neighborhood.

The bicycle sled has the added advantage of complete safety.



Turn to page 119
Then Clip the Coupon!

THE announcement which the Y. C. Lab is making this month on the inside rear cover of The Youth's Companion is of extraordinary importance to every boy in the United States or Canada. It is the offer—free and with no strings attached—of nothing less than a life career. To enjoy this wonderful opportunity, it is not legally necessary to be a Member of the Y. C. Lab, but every wise boy will realize the advantage of intimate association with the organization which offers it and will, with all haste, clip and mail the coupon below. Mailing this coupon may be the most important step you will ever take in your life.

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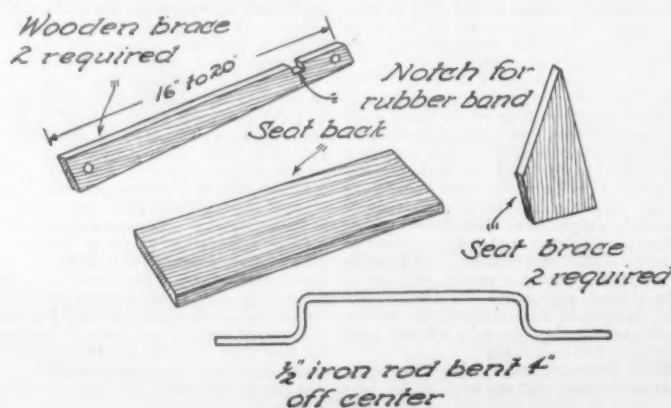
STATE

2-29

of the extra parts needed. Since you will probably want to adapt the motive power to a sled you already have, full dimensions cannot be given. The ingenious Member of the Lab will, however, have no trouble in adapting the general design to his own materials.

You need first two arms from 16 to 20 inches long, depending both upon the length of your sled and upon the diameter of your bicycle wheels. These may be cut from ordinary 1-inch boards and should be $2\frac{1}{2}$ inches wide at one end and $1\frac{1}{2}$ inches wide at the other. In the thick end, bore a hole $\frac{1}{4}$ inch in diameter. In the other, bore a $\frac{1}{2}$ -inch hole, which will later become the bearing for the iron crankshaft. Four inches from the small end, cut a notch to take the band of rubber which will hold the wheels firmly against the ice.

The iron rod should be about 16 inches longer than the width of the sled. Make the offset 4 inches deep. If you find it handy, slip a piece of gas pipe on the rod before you bend it, so that the pipe will later be confined in the offset portion.



The Secretary's Notes

HHEADQUARTERS has received an extremely interesting letter from Member W. L. Nelson, Jr., of Columbia, Mo. He reports having read the article on Fuzzypups in the December issue with a great deal of interest. He further reports that he has made over one hundred of these dogs and by selling direct and to dealers was able to clear \$18.75 from the sale of fifty of them. He submitted a most interesting description of his process which deserves warm recommendation. The opportunities for financial profit to industrious Y. C. Lab Members are great.

The Y. C. Lab takes pleasure in reminding its Membership that a national competition in Soap Sculpture is now under way and closes on May 1. Thirty-six different prizes are offered for the best examples of sculpture done in white soap by amateurs and a distinguished committee will judge the results. Y. C. Lab Members who are interested should ask for details from the National Small Sculpture Committee, 80 East 11th St., New York City.

Now that another Y. C. Lab scholarship competition to find the "best discoverable boy" to whom will be awarded the prize of four years of residence at Massachusetts Institute of Technology is under way, (see Page 119) it is interesting to note that several alumni of the Y. C. Lab are already studying at the Institute. They are: Albert F. Bird (Junior), of Somerville, Mass., F. William Bang (Sophomore), of Newtonville, Mass., Charles B. P. Hodge (Sophomore), of Germantown, Pa., Stanley Johnson (Freshman), Nyack, N. Y., Leslie H. Reed (Sophomore), of Montague City, Mass., Elwood W. Schafer (Freshman), of Cleveland, O., and Rodney D. Chipp, Jr. (Freshman), of New York City. A roster of which the Y. C. Lab is justly proud!

Questions and Answers

Q—I understand that it has long been the dream of man to visit the planets, but it seems science has not yet advanced far enough to accomplish this. As the moon is our closest known celestial neighbor, it seems that it would be naturally the easiest to visit. As man cannot visit a planet, and live, why not send a messenger instead? Why not send a rocket to the moon that had a motion-picture camera included? Now, I realize that this may sound very silly, but, as some practical things have been developed out of seemingly silly suggestions, I am asking your opinion of this. Associate Member H. J. Daily, Jr., Box 266, Owensville, Ky.

A—By Councilor Young: The great difficulty in projecting any object from the surface of the earth is the enormous velocity which must be imparted to the object in order to get it away from the earth's gravitational field. If we neglect air friction, it is necessary to give the body an initial velocity of seven miles per second in order to insure that it will not return. Air friction would make this value much higher. The enormous velocity would cause the friction forces to be very large, and the projected object would get very hot. It will probably not be feasible to send a human being in such a rocket. A proposed scheme is to send a rocket within a rocket, so that upon landing upon the surface of some other sphere the second rocket will explode, and this can be noted upon the earth's surface.

Q—What is the wing span of the largest airplane in the world? How are mountains surveyed to find their height? Member Albert Strange, Hobart, Ind.

A—By Councilor Magoun: The largest wing span of any airplane in the world is 160 feet. This plane has just been built in England and is an all-metal monoplane.

The heights of mountains are found by means of a barometer. The higher above the level of the sea you go, the thinner the air becomes, and consequently the less the atmospheric pressure. By measuring the pressure the heights can be calculated.

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STANLEY TOOLS

The Honors List for February

Ten new Members of the Y. C. Lab receive cash awards and national recognition for ingenious projects



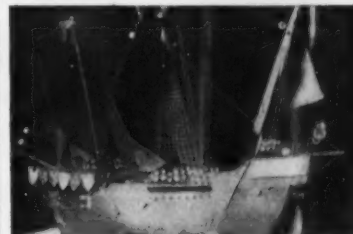
1: Member Hopkins' project

MEMBER JOHN F. HOPKINS (15) of Marysville, Mont., leads the February Honors List with the covered truck shown in Illustration 1. The truck has electric lights made of two old radio dry-cell batteries hooked up to flash-



2: Member Heath's project

light bulbs inserted in small-size milk cans. A switch on the dashboard turns the lights on or off. The steering gear is made of an old valve wheel on the end of a 3/4-inch pipe under the hood. Ropes wound in opposite direction on the pipe transmit the pull to the front axle. There is a brake which works on both rear wheels. Member Hopkins is shown standing beside his truck. Illustration 2 shows Member GORDON R. HEATH (16) of West Somerville, Mass., with the model plane of his own design—one of several of his con-



3: Member Brown's project

struction which have been prize winners. The plane has achieved a flight of 75 feet, taking off under its own power. Illustration 3 is the work of Member GEORGE B. BROWN (14) of Normal, Ill. Member Brown says: "The ship model is a typical ship of Columbus' time. I named it Adventurer. It is 26 inches long and has a beam of 6 inches. She flies the merchant flag of Spain and a long pennant from her tri-sail yard."



4: Member Phalen's project

The cost of the completed ship was \$2.65, and Member Brown began work in March, finishing in August. Member LESLIE R. PHALEN (13) of West Newton, Mass., constructed the sail wagon shown in Illustration 4. The necessary materials were only a discarded wagon and an old awning. Member Phalen reports that, although the speed of the sail wagon is slow, the design is successful, and he does make progress. Illustration 5 shows Member ALBERT TUTTLE (11)



5: Member Tuttle's project

of Elmira, N. Y., with his wood-turning lathe. He says: "I first made a simple bench with a slot from one end to the other. I purchased a polishing head and a second-hand quarter horse-power motor to run it. The polishing head I used for the headstock. The tailstock is part of an old vise. The tool rest is made of wood." An excellent piece of construction, particularly for a junior member. Illustration 6 shows what Member STUART DISTELHORST (15) of Louisville, Ky., refers to as a color wheel.



6: Member Distelhorst's project



7: Member Aschauer's project

It is a cardboard wheel 16 inches in diameter, with 6 holes of 4-inch diameter cut in it. These holes are covered with violet, orange, blue, yellow, red and pink paper. The wheel is fastened to one end of a shaft, and the other end is connected by pulley and belt to the source of power. When a light behind the colored disks is lit and the crank turned, the wheel creates a fantastic color effect, and Member Distelhorst mentions particularly its use for the illumination of a Christmas tree. We commend this excellent idea to other Members when another Christmas rolls around. Member G. ASCHAUER (12) of Springfield, Ill., is shown in Illustration 7 with a 10-foot birch-bark canoe which he built—a most unusual and commendable project. He reports that it has successfully passed the test of cruising along the shores of Lake Michigan. Illustration 8 shows Member JULIUS HALL (16) of Kenosaw, Neb., with his motor-driven power saw. It is driven by a 1/4-horse-power electric motor, and will saw



8: Member Hall's project

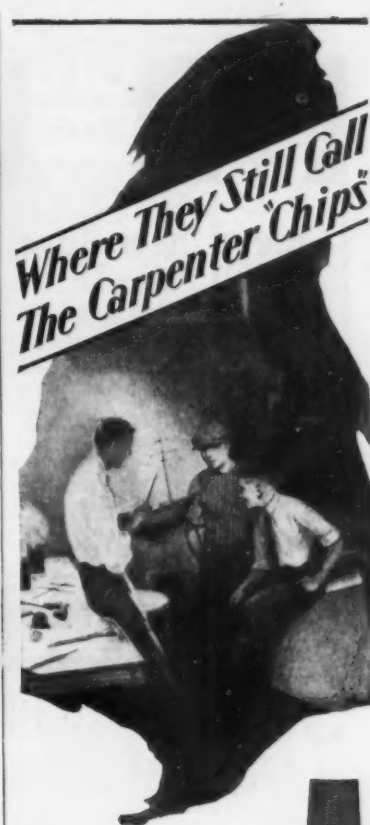


9: Member Hodgman's project

wood up to 2 1/2 inches in thickness. It will rip, mitre, or make grooves. The body of the Ford car shown in Illustration 9 was constructed by Member EDMUND HODGMAN (16) of Manchester, N. H. Member Hodgman built the body without patterns, making it altogether by measurements from the chassis. Illustration 10 shows Member W. C. BEALL, JR., (12) of Bunkie, La., with his realistic hoisting derrick, which he constructed largely, but not exclusively, from the parts of an Erector set.



10: Member Beall's project



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MODERN RADIO and TELEVISION

Conducted by Y. C. Lab Councilor J. K. Clapp, S.B., S.M., Radio Engineer

Editor's Note: Councilor Clapp or one of his associates will be glad to answer any of your radio questions. Address him at The Youth's Companion, 8 Arlington Street, Boston, Mass. It will be necessary to disregard inquiries unless accompanied by a stamped, self-addressed envelope.

A Long-Wave Receiver

THOSE who are interested in the many fields of radio other than broadcasting will derive pleasure and amusement from building and operating the receiver described this month. The signals heard on long waves open up a splendid field for self-training in the reception of messages in the telegraphic code, for the operating speeds are considerably lower than on the shorter waves. It may come as a surprise to many, who believe that some six hundred broadcast stations constitute the major part of our country's radio activity, to learn that there are thousands of stations of other classes. This receiver is designed to receive some such stations operating on wavelengths longer than the broadcast band.

The circuit of this long-wave receiver is theoretically identical with that of the short-wave receiver which I described in these columns last December. The differences are practical ones only; mainly in the arrangement of the antenna circuit. For efficient reception of long-wave signals, particularly on the relatively small antenna which we are able to put up at our homes, it is essential to tune the antenna to the

lower corner, is mounted the small "series-parallel" switch for the antenna tuning condenser. The left-hand dial controls the antenna condenser (C-1); the right-hand, the secondary tuning condenser (C-2). The small knob in the center of the panel is the control for the filament rheostat. Binding posts for the telephone receivers are provided at the right-hand end of

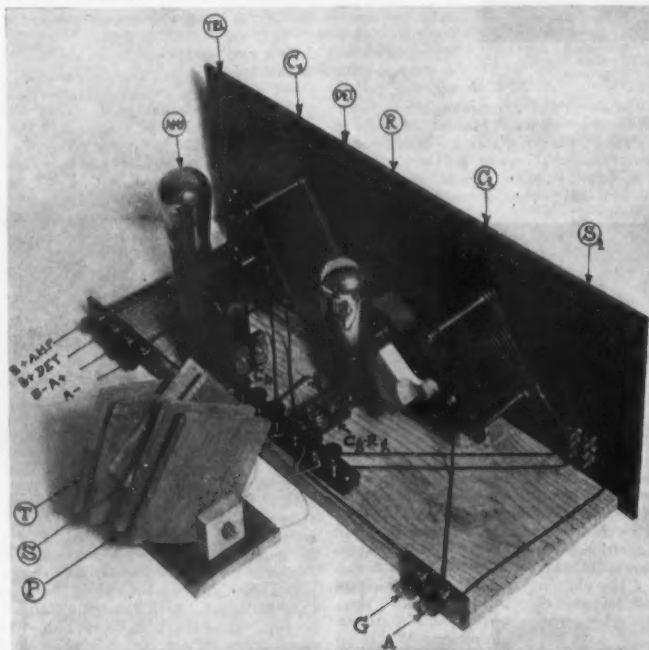


Fig. 2—Skeleton photograph showing layout and arrangement for all parts of The Youth's Companion Long-Wave Receiver

signal. To avoid the use of several additional antenna coils, we make use of a double-pole double-throw switch (S-1) to transfer the tuning condenser (C-1) from a position in series with the antenna and coil to a position in parallel with the coil. This arrangement enables us to obtain two ranges of wavelength in the antenna circuit while employing a single coil. These ranges are so related that they slightly more than cover the range of the corresponding secondary coil. This is an advantage which will become apparent in operating the receiver.

Fig. 1 shows the front view of the completed receiver. At the left-hand end of the panel, in

the panel. The three coils, in their mounting, may be seen in position on their base in back of the baseboard of the rest of the receiver.

The rear view of Fig. 2 shows the construction of the set quite plainly, the various parts carrying designating letters to correspond with the schematic diagram (Fig. 3) and the list of parts. The two binding posts in the front corner of the baseboard are for the antenna and ground; the set of four binding posts at the rear of the photograph is for the connection of the batteries. In this receiver a set of six binding posts is provided for making connections to the coils; other arrangements may be used, such as the provision of a suitable switch. If you are not inclined to such elegance of construction, six round-headed wood screws may be used, with washers under their heads for holding the wires. The variable condensers (C-1 and C-2) should be of 0.0005 mfd. maximum capacity, or larger. The transformer (Tr) may be a 6 to 1 amplifying transformer. A rather high ratio may be toler-

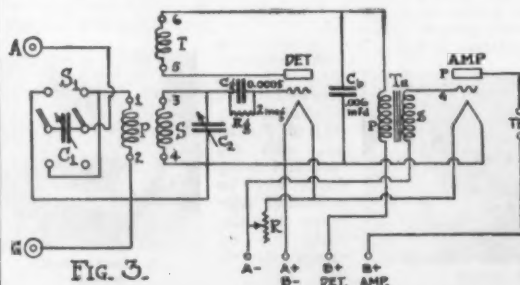


Fig. 3.

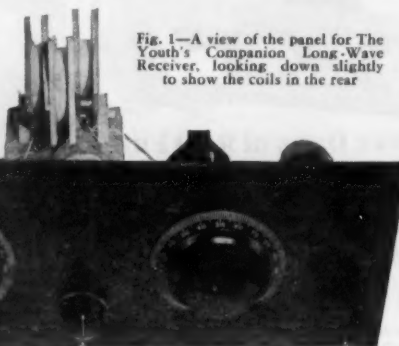


Fig. 1—A view of the panel for The Youth's Companion Long-Wave Receiver, looking down slightly to show the coils in the rear

PARTS LIST

Letter	Part	Approximate Cost
	Panel 7 x 14	\$ 1.05
	Baseboard 7 x 12
S-1	D. P. D. T. switch	.25
C-1, C-2	Variable condensers, 0.0005 mfd. maximum	6.00
	Dials (2)	1.00
R	Rheostat, 25 ohm, 1/2 amp.	.50
	Sockets (2)	1.00
Tr	Amplifying transformer	4.00
C-b	By-pass condenser 0.006 mfd.	.30
C-g	Grid condenser, 0.0005 mfd.	.25
R-g	Grid leak resistance, 2 megohms	.30
	Binding posts (14)	.70
		<hr/> \$15.35

ated for a single stage amplifier, even when reception of voice signals is to be carried out; for code signals it is desirable to realize as much amplification as possible with the number of tubes available.

The coils are easily made at home. A few pieces of wood about 1/4 inch thick, from a packing box or crate, will serve admirably for the forms. Two pieces about 4 inches square, should be cut for each coil. A disc about 2 inches in diameter should be cut from similar material. This disc does not need to be exactly circular; cut a square first, then cut off the corners to make an octagon. Using some brads, fasten the square pieces to the round or octagonal center, to form a deep-grooved spool. (See Fig. 4.) Make three such spools for each set of coils you desire to build.

When used with the specified variable condensers, the coils should have the number of turns given below to cover the proper wavelength ranges. If the variable condensers have somewhat higher maximum capacity, then the ranges of wavelength will be slightly greater

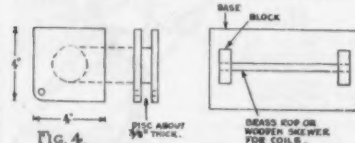


Fig. 4.

than those indicated. A single wire antenna from 100 to 500 feet long, and as high as can be erected, will give satisfactory reception.

COIL DATA

(All coils wound with No. 28 double cotton covered wire, and wound in the same direction)

	Set No. 1	Set No. 2	Set No. 3
Primary.....	75	200	600
Secondary....	110	250	600
Tickler.....	35	75	150
Approximate wavelength range in meters....	550-1500	1250-4000	3000-9000

In winding the coils, hold the form in one hand and wind the wire on the spool with the other to form a "higgledy-piggledy" winding. Do not try to make the winding in even layers. Chamfering the inside corners of the form with a knife will prevent the wire from catching.

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Holes drilled through the square side-pieces of the form, in one corner, provide for mounting the coils on a brass or wooden rod. If desired, the center coil (secondary) may be fastened rigidly to the base by brads driven through the bottom. The primary, or antenna, coil and the tickler may then be mounted on a rod passed through the secondary coil form. In this construction, it is not necessary to make the small blocks which are used to support the rod, and which are shown in the photograph.

Practically any of the standard types of tubes may be used; plate voltages of about 67 volts are generally ample. Standard radio telephone receivers should be employed.

In operating the receiver, it is convenient to connect the coils in the following manner: Inside of the antenna coil to post No. 2, or

only one click is heard, it is probably not oscillating, and the tickler should be moved so that it more nearly covers the secondary. When the tube has been made to oscillate, the primary coil should be placed so that it partially covers the secondary coil. The antenna condenser should be varied over its range, with the switch in the series position, and then, if necessary, with the switch in the parallel position. At some point on the dial, a click should be heard; then, when you advance the dial in the same direction, another. The space between these clicks, as indicated on the dial, marks the region in which the antenna absorbs so much energy from the circuit that the tube stops oscillating. The primary coil should then be moved so that it will not cover so much of the secondary; you will then find that the two



ground. Outside of the antenna coil to switch S-1, or antenna, via post No. 1. Outside of the secondary coil to post No. 3, to grid of tube; inside to post 4, to filament and ground. Outside of the tickler coil to post No. 5, to plate of the tube; and the inside to post 6, to the bypass condenser and transformer. The outside ends of the windings are thus connected to the odd-numbered posts, and the inside ends to the even-numbered posts, so that it is a simple matter to change the coils quickly.

When starting up the receiver, place the secondary coil in some convenient position; then move the tickler coil, relative to the secondary, so that it partly covers the secondary coil. The tube should now oscillate, and the oscillation can be detected by touching the grid terminal of the secondary coil. If a click is heard in the receivers when the terminal is touched, and when it is released, the tube is oscillating; if

clicks have moved closer together on the scale of the antenna condenser.

The process should be repeated until the two clicks merge into one. The set may then be tuned for a considerable range on either side of this point by adjustment of the condensers, without readjustment of the positions of the coils. If the double clicks appear when tuning to some other wavelength, move the primary coil so that it does not cover as much of the secondary, or bring the tickler to cover slightly more of it; if no clicks at all are obtained, move the primary to cover more of the secondary.

A little practice in handling the set is necessary to get the best signals, but the operation is simple, and, once mastered, it is not at all difficult to adjust the receiver to any desired wavelength in its range. The setting of the condenser C-2 may be recorded as a guide for picking up a given station at a later time.

ABOARD THE ENEMY

[CONTINUED FROM PAGE 71]

put the brief-case and its contents beyond the power of the enemy; he might even have a heaven-sent opportunity to be the cause of destroying the submarine itself.

The first five days of the cruise were uneventful. Nightly the U-boat came to the surface to charge batteries. As Jim had had two years in submarines, he was familiar with routine. He appreciated the sharp discipline aboard; and he viewed with not a little admiration the perfect condition of torpedo tubes, engines, diving gear and other appurtenances of the boat.

On the sixth day the U-boat sighted a tramp steamer. Jim knew this because Von Grahl became human long enough to let him have a glimpse of her through the periscope.

"Bound for Liverpool, no doubt," said the German, "where she will feed those who are killing my countrymen in France."

With blown tanks the submarine emerged. Jim was permitted to join Von Grahl on her deck. A thousand yards ahead lay the tramp.

When the tramp hove to after a shot from the German's deck gun, her boats could be seen dropping from her sides. Dingy men filled them, obviously panicky from the nearness of the enemy.

"This will make a million tons of shipping down to date," observed Von Grahl expansively.

At a range of two hundred yards the U-boat fired her torpedo. She had circled for a perfect shot and also to be sure that the tramp was as innocent as she looked. But since there had been no sign of a gun aboard, and the vessel's decks were deserted after the tumultuous rush of those in the drifting boats far astern, there seemed no reason for the U-boat's delaying her little task of destruction.

The torpedo struck home with a dull explosion and a column of white water mixed with the yellow fumes of the high explosive. A cheer broke from the triumphant group on the U-boat's deck.

The next instant this cheer changed to a chorus of dismay. As if by a miracle the well-deck bulwark aboard the tramp dropped over her side, revealing a hidden battery of three guns. Just below her bridge structure a flimsy bulkhead fell, disclosing two more guns. Not a helpless travel streamer, after all, but a fully armed Mystery Ship! Simultaneously and at almost point-blank range the guns opened fire. The water around the U-boat boiled and geysered with the shells that sprinkled about her.

Perhaps Von Grahl had been suspicious. Anyway he was nearest the hatch when the

fearful fire broke out. And, because Von Grahl was his particular antagonist, Jim was by him. So, when Von Grahl sprang for the hatch Jim like a flash seized him by his collar and with a quick whirl threw him clear.

"They'll kill you too!" cried the German officer frantically. "Your only chance is below!"

Already someone in the conning tower had begun to close the hatch. The U-boat was slowly submerging. Another minute and she would be safely beneath the surface. Those aboard her would float easily off and be picked up by the Britisher.

In that minute Jim Dale could save himself. All he had to do was make a quick dive over the side, swim a few yards under water and be safe.

JIM did not hesitate. His country was at war. His ally was in action against the common enemy. Little matter that he was in desperate peril by exposing himself to the hail of death that poured from the tramp's two batteries.

The hatch was half-closed when Jim dove to Von Grahl's side as the latter stumbled awkwardly to his feet. He snatched the German's automatic from its holster. On hands and knees he thrust the steel gun squarely into the hinges of the hatch.

The U-boat submerged. By a miracle she had not been struck. But her water-tight integrity had been spoiled by Jim's quick wit: the hatch could not be closed. Between its lips, held wide enough by the half-crushed pistol the sea poured in.

In a gasping rush the U-boat broached again. Those on the Britisher, knowing war, held their fire. One by one the U-boat's crew poured out of her hatch and lined her deck. Her commanding officer surrendered with what grace he could.

To a gaping group Jim gave the facts. But it took two hours of radio with London before full credibility could be established for his wild tale.

Then, as an apology of sorts, the English commander sent this supplementary message to be added to official report:

"Further reference capture U-99: chief credit must be given Lieut. James Dale, U. S. Navy, prisoner of war aboard her. Without him action would have been unsuccessful. Details on arrival port."

Then to Jim he said with a pleased grin: "Means you'll get a medal and all that, old top. Nice, what?"

"A break," drawled Jim. "Just a break. Sometimes they're tougher than others."



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The Club for
All the Girls of
The Youth's Companion

THE G.Y.C.

Directed by
Helen Ferris and
our Active Members

OF all months for parties, February is the best. With paper hearts for Valentine's Day, and red, white and blue frills and the axe and the cherry tree for Washington's Birthday, and equally attractive and gay decorations for a Lincoln's Birthday party, the difficulty is not in deciding whether to give a party in February, but how many parties and what kind!

What makes a good party? There isn't a single question in which G. Y. C. girls are more interested. To get the answer, I not only have read thousands of helpful letters from them since I have been here, but the other day I went to a hostess in New York—quite the most charming hostess I know. "Why does everyone have such a good time at your house?" I asked her. "Parties like yours don't just 'happen.' Which do you think is more important, for instance—delicious refreshments or interesting games, or what?"

She laughed aloud, and then she considered the question.

"I think," she said at last, "that it is all a matter of having a good time at your own party. You can not do that unless you make perfect plans. But you must be willing to change the plans instantly, if things drag."

"Tell me how you do it," I asked her then. "From the very first minute you decide to give a party straight on through it all until the guests have gone home."

She told me and I think I remember her answer well enough to put it in her own words,

How She Does It

Whenever I decide to have a party (said this hostess) I think first of the occasion for it. Sometimes the very best parties are those for which there is no special occasion. But it always helps to have a real reason for giving a party—for instance, a dinner on Christmas, a Valentine's Day party, or whatever else it may be. After I settle that, I think of the people whom I want to invite. I don't just think of their names—I think of their personalities, too. Will they all enjoy being together? Am I quite sure I am not inviting two very different cliques or sets? Sometimes such parties are a great success, but usually it is best to have only people who are sure to be congenial. For instance, I know that all the members of my own club like one another. I am careful to limit my parties, as far as possible to people of about the same age. Of course, the presence of a few young people is delightful in an older party; and there are even some old people who become the very "life of the party" in a group of young ones. But generally speaking the rule holds that it is a good thing to invite people of about the same ages, tastes and wishes.

My house is not very large, so I am always careful to ask no more people than I can entertain comfortably. In the country, when we can have a picnic out of doors, there is hardly any limit to the number of guests, except the number of plates, knives, forks and spoons that you may have! But here in town, I find that my dining-room is only large enough for a party of fourteen, and twelve or even ten are much more comfortable. If we are going to play games at tables after lunch or dinner, I take into consideration how many tables can be placed in my parlor. Three tables with four players each is about the limit; or three tables can be put next each other, and I find that makes room for eight players of pencil and paper games and the like.

After I have selected the guests and decided in my mind what sort of entertainment we shall follow—it may range from dancing to the old-fashioned games like Hearts or Consequences or any of the others that you know so well—my next thought is for the decorations.

Often I need nothing more than flowers on the tables, but sometimes—for instance, on Valentine's Day—I get paper hearts, etc., while for



Here is a table attractively set for a valentine luncheon or dinner party. The decorations are simple and easily made and not so pretentious that they take the minds of the guests off the pleasure of dining

FEBRUARY FOR PARTIES

the Fourth of July or Christmas or almost any party to which very young people are coming I get little toys to put at their places. Once when entertaining a railroad president, my young son helped me by setting up his electric trains on the table, and the little locomotive pulled cars loaded with bonbons and almonds around the table for dessert.

This amused the railroad president quite as much as it amused my son.

In the same way you can make very amusing table decorations appropriate for almost any cause or holiday. But you should not overdo this idea; it can be a bore rather than an amusement if it isn't done very well and with a great deal of restraint.

Generally speaking, people like to see on the

dining-table only flowers, candies, nuts, etc., in addition to the necessary plates and table ware. After all, one sits down to a table to dine, and anything that distracts too much from dining may turn out to be an annoyance.

Games That Go

The details of games naturally vary with every party. But certain ways of making your plans hold good no matter what the occasion is. Plan everything in plenty of time and don't make your refreshments so elaborate that you have little or no time to spend on the games yourself.

Make your first game a lively and amusing one which will get your guests moving about and

talking with one another. When you have had a lively game, follow it with a quieter one, such as a guessing game or one of the word games which are so popular just now. If the number of guests is large, do not try a game that calls for individual turns, because such games become boring unless they are done in small groups. The only way to make them successful at large parties is to divide the guests into teams that compete with one another or into couples with one person playing for his team.

Be as careful in planning the details of the games as you would be in business. If you are going to have a written game, for instance, have on hand not only plenty of sharp pencils (including a few extra for broken points) but also be sure that your guests will have something on which to write. Light-weight cardboard instead of paper pads has helped many a writing game to success—and be sure to have enough of it so that the guests won't have to tear their sheets into halves or quarters and share with one another, thus slowing down the game.

Above all, have a good time yourself. If the hostess looks worried for fear things won't go off well, the very expression of her face will often produce that very result. Similarly, move around the room or rooms a great deal. Don't confine yourself to the society of just a few of the guests, but be with all of them and let them see that you are enjoying yourself. Enjoyment is contagious, and a good laugh can often do more for the success of a party than the inexperienced hostess can possibly realize. People imitate you. When you smile, they are almost sure to smile. When you frown or look worried or distracted, the expression on your face will almost immediately be reflected in their faces too.

Ideas from Everywhere

Having reported these words of wisdom to you, I will now supply some party ideas that help to carry out my friend's general suggestions.

On our cooking page this month you will find that Miss Bradley has selected for you a number of refreshments which can all be prepared well in advance, so that you will indeed be a smiling and carefree hostess.

Have you ever been to a masquerade party where the costumes were gotten up after all the guests had arrived? Sometimes invitations to masquerades are not gratefully received, because it is such a bother to think about a costume and make it. One of our girls writes that she never had more fun than at a party where the girls were assigned to one room and the boys to another as soon as they came in. In each of these rooms was a great assortment of quaint clothes and properties of all kinds.

A good game for starting the ball rolling at any party is the one in which the hostess pins on each guest's back the name of a famous man or woman. The guest doesn't know who he is but must find out by asking questions, to which the other guests must reply only yes or no. Some interesting characters for this game are Washington, Lincoln, Lee, Mary Queen of Scots, Romeo, Juliet, Simple Simon, Priscilla Alden, and so on straight down to modern notables like Colonel Lindbergh and Helen Wills.

There should be some special favors for those who first discover themselves, and the game should be limited to a very short time so that it won't drag. Everyone likes to come to a party when something is already going on, and this game will accomplish that for the hostess.

I suggest these books for your own party shelf: "My Book of Parties," by Madeline Snyder (Doubleday, Doran); "Parties for Occasions," by Nellie R. Gates and Claire Wallis (Century); the "Stunts" books by Edna Geister—"The Fun Book," "Ice Breakers," and "It Is to Laugh" (Doubleday, Doran)—and "Stunt Night Tonight," by K. A. Miller (Doubleday, Doran).

HELEN FERRIS.

GIRLS WHO ACHIEVE

Dorothy Loomis Had 358 Jobs in Two and One-Half Years

Dear Helen Ferris: I earn my money by taking charge of children whose parents go out quite a bit. I charge fifteen cents an hour, but have found that isn't enough. If I were starting in a new place, I think these are fair prices: twenty-five cents an hour, afternoon; twenty-five cents an hour, evening, if the children are in bed, otherwise twenty-five or thirty cents.

From January 1, 1926, to June 1, 1928, I earned \$143.44 and had 358 jobs in this

time. One little hint to the starter. Divert the child's attention, if he is doing something he shouldn't, and won't stop. I play games with the children, read, go to the park, go for walks, and do kindergarten work. I have found the Children's Pages very good for stories and handicrafts. I am planning to be a kindergarten teacher, as I now think I have a natural ability with children—but how would I have ever found out, if I hadn't tried it?

Dorothy Loomis, Wayne, Nebraska.



The letters "G. Y. C." signify "Girls of The Youth's Companion," a girls' club with members everywhere in America. This is our keystone pin, of gold and blue enamel.

To HAZEL GREY, Secretary, G. Y. C., 8 Arlington St., Boston, Mass.

Dear Hazel Grey: I am a girl who has seen the G. Y. C. pages in The Youth's Companion, and I am interested in doing the things your girls have done.

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THE G.Y.C.



Miss Alice Bradley, Principal of Miss Farmer's School of Cookery, who wrote this article for you, and who will write many more as fine for you in the future

Valentine's Day—G. Y. C. Style

THESE tested recipes will help you to celebrate Valentine's Day in true G. Y. C. style. Here are all the refreshments you will need for an evening party, although you may add ice cream to them if you wish. You may also wish to choose between the marguerites and a cake. The marguerites are more easily prepared but may not be quite hearty enough in case you omit the ice cream.

First comes the sandwich loaf. Make it festive with tiny red hearts one inch or less in diameter cut from pimento. Place one of these at each top corner, with three hearts running lengthwise across the top. These decorations will be easily held in place by the cream-cheese coating. If you have no small metal heart-shaped cutter, you can easily make a cardboard pattern and cut round it with a sharp-pointed vegetable knife. After being cut the loaf should be served on plates with forks. The mixed pickles will taste well with this loaf.

For dessert buy brick ice cream or pack homemade ice cream in a tightly covered oblong mold. Raspberry or loganberry ice will be even more suitable than ice cream because of their rosy color. This dessert may be made to resemble a lacy valentine by fitting a paper doily border

seasoned with $\frac{1}{4}$ teaspoon salt, $\frac{1}{8}$ teaspoon pepper, $\frac{1}{4}$ teaspoon paprika and $1\frac{1}{2}$ tablespoons mayonnaise.

Remove all the outside crust from the bread, then cut in five lengthwise slices of the same thickness. Reserve one slice for top of loaf. Cream butter and spread on four remaining slices. Then spread one filling on each of the four slices. Put slices together evenly and firmly with the reserved slice on top. Mash one-half pound cream cheese, soften if necessary with a little milk or cream and spread over the top, ends and sides. Place on platter and decorate if desired.

MIXED SWEET PICKLES

Put in small agate or enamel saucepan 1 cup vinegar, $\frac{1}{2}$ cup sugar, 2-inch stick of cinnamon, $\frac{1}{4}$ teaspoon blades of mace, $\frac{1}{4}$ teaspoon whole cloves, and cook two minutes. Add $\frac{1}{2}$ cup candied cherries, and cook five minutes; skim out. Add $\frac{1}{2}$ cup large Malaga raisins in clusters of two or three. Cook ten minutes, remove raisins and add 12 small sweet cucumber pickles; cook ten minutes. Use to garnish the sandwich loaf. This recipe has been taken from Alice Bradley's book, "For Luncheon and Supper Guests."

CONTEST!

"MY Favorite Candy Recipe."—This G. Y. C. contest is open to every girl who reads The Youth's Companion. Each girl who enters the contest is entitled to enter three of her favorite candy recipes. Give all ingredients and directions accurately. Tell how much candy your recipe makes. If you know where you found it, give the source. Use the form, given here, of Lucile Jordal's praline recipe. Lucile won Honorable Mention in our last cooking contest.

SANDWICH LOAF

From Ruth M. Rowe, Lewiston, Me.

1 medium-sized loaf sandwich bread
 $\frac{1}{2}$ cup butter
 $\frac{1}{2}$ pound cream cheese

First Filling
 $\frac{1}{2}$ cup deviled ham, or $\frac{1}{2}$ cup chopped ham moistened to paste, with cream or salad dressing.

Second Filling
 $\frac{1}{4}$ pound cream cheese, mixed with 1 sweet pickle chopped and 1 sprig parsley chopped.

Third Filling
1 dozen stoned chopped dates, mixed with 6 tablespoons chopped nuts and moistened to a paste with a few drops of hot water.

Fourth Filling
Yolks of 4 hard-cooked eggs, mashed,

PRALINES

From Lucile Jordal, New Haven, N. Y.

2 cups confectioners' sugar 1 cup molasses
 $\frac{1}{2}$ cup cream 2 cups nutmeats
Boil sugar, cream and molasses together to 238 degrees F., or until a little dropped in cold water forms a soft ball. Cool and beat until creamy. Add nuts and drop mixture by spoonfuls on waxed paper or greased plates. This recipe makes thirty pralines three inches in diameter.

If you enter more than one recipe, write each on a separate sheet of paper. Write on one side of the paper only. Put your name, age and address at the top of each sheet. The members of the Cooking Department of The Youth's Companion will be the judges of this contest. The first prize will be a complete set of candy-making equipment personally selected for this contest by Miss Bradley. The second prize will be a copy of Miss Bradley's own "Candy Cook Book," autographed by her. The third prize will be a candy thermometer.

This contest closes March 15, 1929. Send your recipes without delay to HAZEL GREY, 8 Arlington Street, Boston.

HOT CHOCOLATE

Melt 2 squares unsweetened chocolate over boiling water. Add $\frac{3}{4}$ cup sugar and a few grains of salt and stir until well mixed. Pour on gradually $\frac{1}{4}$ cup boiling water and stir until smooth. Boil five minutes. Add to two quarts scalded milk, beat with egg-beater until well mixed, and heat in double boiler. Serve one marshmallow with each cup.

MARGUERITES

From Adelaide Jordan, Bar Harbor, Me.

Whites of 2 eggs
1 cup powdered sugar
 $\frac{1}{2}$ cup walnuts
2 dozen saltines

Beat whites of eggs until they begin to stiffen. Add powdered sugar gradually, continuing to beat until mixture is stiff, then add walnuts. Put a spoonful of the mixture on each saltine. Put in slow oven, 300 degrees, for ten minutes or until delicately browned. And by all means send in your favorite candy recipes today for our new contest.



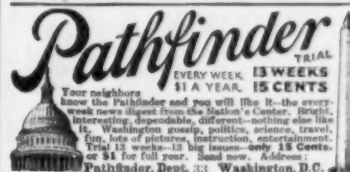
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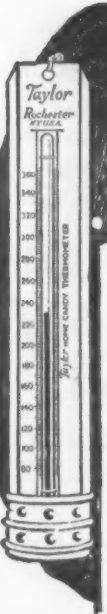
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THE G.Y.C.

G. Y. C. Girls Enjoy Music

THIS month the G. Y. C. honors chiefly those Members who are especially interested in music and have sent in excellent achievements in music. Genevieve Cowles, Woodhull, Ill.; Urcelle Curry, Smackover, Ark.; Ruth Galloway, Auburn, Wash.; Florence Kaplan, Laurel, Miss.; Jessie Newman, Wenatchee, Wash.; and Elizabeth Timmerman, Greenwood, S. C., are the members of our February musical Honor Roll.

In addition to her own work in music, Jessie Newman has been helping a small girl with her practice hour. Each afternoon after school Jessie goes to her house and shows her how she can better her playing. Jessie says, "I think one of the important things in such work is to win the child's heart, for if a child enjoys your company the practicing is not nearly such a burden. I also consider this work a help to me.

and saved during the last six months of 1928. It makes no difference how you earned the money—anything from taking care of children to singing at the Metropolitan Opera House in New York will qualify you for the prize. The G. Y. C. is unlike any other girls' club, you know. It doesn't require you to do any one thing—it succeeds because it helps you to do still more efficiently the very thing in which you are interested.

In this way, after our three very interesting and significant years of organization, we are now prepared to help any girl to do anything! Sometimes I think this point can't be fully understood by our newer readers, because they sometimes hang back for a long time before sending in a letter to get advice or assistance.

Some month soon, I'm going to print a lot of



Virginia Gray,
Corning, Ohio



Alicia Bishop,
Northwood Ridge,
N. H.



Ruth Smith, Baseline, Mich.



Ruth Galloway,
Auburn, Wash.



M. G. Pease,
Winchendon Mass.

The little girls asks me many questions which make me think. I am also earning money at the same time, which I appreciate.

Elizabeth Timmerman keeps a musical scrapbook in which she pastes pictures of famous musicians clipped from such magazines as 'the Etude and the Musician, and notes of the important events in each man's life. She also has a division, "Miscellaneous," for favorite musical quotations and other material. Elizabeth, as president of the Junior Music Club of her school, uses this book in arranging interesting programs.

Genevieve Cowles has an entire orchestra in her own family. Her brother of fifteen plays the clarinet; the brother of twelve plays the piano; Genevieve, eleven, plays the saxophone; her sister, nine, plays the violin; and her brother of eight plays the drums. We wish they could all come and give us a concert!

Urcelle Curry taught music during her last summer vacation. The suggestion for doing it came from her own music teacher. Before school was out, she spoke to several mothers about the plan, and by the time vacation arrived she had a class of four. Her teacher gave her a great deal of help about teaching. After vacation was over, Urcelle had not only earned her own money, but she had a class of pupils who wished to continue with her. She is now earning sixteen dollars a month, and this work is all she has time for outside school.

Florence Kaplan has given concerts successfully, while Ruth Galloway writes a very interesting letter about her love for music. I am also publishing the pictures of Virginia Gray and Alicia Bishop because they have recently sent in such splendid enterprises in sewing that they deserve honors, even though this is Music Month.

Don't forget to send in your Treasure Chest reports, Active Members. These are the records of what you have earned

these letters, and the replies we sent to them. They cover all subjects. I do believe that you can't find a subject that some other girl of the G. Y. C. hasn't written about already, and that we have looked up for her. But if you can, so much the better. We like to look for facts!

Remember, the best Treasure Chest report will entitle the sender to a beautiful Treasure Chest, containing a five-dollar gold piece. And some of the others will be printed, and the writers will receive Publication Prizes in cash. Just write to me, making your report as brief and clear and business-like as you can.

Remember, too, that if you wish to become a Contributing Member of the G. Y. C. you must keep your G. Y. C. diary of achievements for one year, sending it in at the end of six months for official approval.

Some of our new members have been asking about these diaries. Keep them in any form you wish—a book which you make yourself or a note book of loose leaves for which you make a special cover. You may make it in any way you wish, in fact. Be sure to make it more than merely an entry of your achievements, day by day. Describe them in as much detail as you have time for. Tell about your disappointments as well as your successes—for every achievement in this world is made up of disappointments as well as successes, and the diaries which have already won Contributing Memberships have been kept in just this way. Next month we shall announce the names of some new Contributing Members.

This month's most unusual achievement honor goes to Elizabeth and Katherine Marsh, Active G. Y. C. Members in Scottsville, N. Y. They have earned one hundred and twelve dollars, helping their father in his surveying—laying claims, holding pickets, and driving stakes.

HAZEL GREY.

P. S. As this column will suggest to you, The Youth's Companion is getting more and more interested in music every day. The Editor tells me he has been calling on famous musicians in New York and Chicago, inviting them to write special articles for The Companion in 1929-30. Watch for these. They will surprise you.

And there is a bigger surprise coming next month—I can only hint at it here, but maybe you've noticed that the Y. C. Lab gives a college scholarship to some fortunate boy every year, and why shouldn't we? Are there any votes against it? If not, look at this column next month, and see what you will see! H. G.



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THE G.Y.C.



FOR the GIRL of CHARM

FASHIONS ESPECIALLY SELECTED FOR THE G. Y. C.

"The Pleasure of Your Company is Requested"

I WAS happy to find these particular party frocks for you among this season's styles, not only because they are attractive in design and will, I know, be becoming to many of you, but also because they are made in materials which are quite likely to be a change from what you have had.

The dress to the right is made of lace trimmed with colored ribbon. I saw it in French blue with silver ribbon and slippers and stockings of the exact tone of silver as the ribbon. It would be equally lovely in aquamarine blue or shell or dusty pink. If by any chance you have on hand material which can be made over into a slip under the lace, you may achieve other effects. I saw one such lace dress in shell pink over a silver slip which was especially attractive. I like this dress for the girl who wishes to accentuate slowness, since the flounce with its flare and irregular hem line runs but halfway up the skirt. This dress may be made from Butterick pattern No. 2312, costing fifty cents.

The dress to the left I saw in a bodice of canary taffeta with *point d'esprit* flounces to match. The flowers on the skirt were made of the same silk as the bodice, and the combination was charming. The design of this dress is very useful if you happen to have party dresses of other days with sufficient material to combine into one. Contrasting materials may be dyed to harmonize or contrast, or the entire dress may be of taffeta with the flowers of the metal ribbon which is so smart. This dress with its flounces may not be suitable for the girl who must think of slender lines, but will be, I am sure, becoming and piquant for many of you, as I know because Hazel Grey has been showing me your pictures. It may be made from Butterick pattern No. 2314, costing fifty cents.

I chose the frock in the center especially for

our older G. Y. C. Members. It was very effective in its simplicity, made as I saw it in tulle, all of white. It would also be attractive in the rainbow colors, in powder blue and even in bright red. I have mentioned before the usefulness of buying white satin slippers and dyeing them to match your dress, and I will admit that I liked this dress for its plain color. However, it is quite possible to add without spoiling its lines the touches of ribbon which are so popular just now. A bow in the center of the waistline in front would be attractive. Or, if you wish more ribbon, you might have a flower ribbon on the right shoulder, with lengths of the ribbon brought from it in a straight line to the waist, a second flower at the waistline, and the ribbon trimming finished in graceful loops below that. In fact, a little imagination, ingenuity and taste in color seem to be all that is needed these days to give original touches to your party frocks.

The dress in the middle is from Butterick pattern No. 2241, also costing fifty cents. And if you cannot buy these patterns at your nearest pattern store, you may write directly to the Butterick Company, 223 Spring Street, New York City, saying you are a girl of The Youth's Companion and ordering the design which appeals to you.

I do hope literally hundreds of you will write me about your special dress problems. This is the most important contest we have had for our Charm Page, because I shall use your letters each month when I go out to select the new styles that I think will appeal to you. Then, too, the best letters will be published here. So, you can see, this is your opportunity to become Assistant Fashion Editor of The Youth's Companion Charm Page. Every girl has her own dress problems, and the well-dressed girl is the one who is solving hers. So, no matter what your problem is, write to me about it. Don't forget that you may make your letter as long as you wish. And of course there is the ten dollars for the best one!

TEN DOLLARS FOR A LETTER!

The prize is yours if you write the best letter describing your special dress problem

WHAT is your special dress problem and how are you solving it? Write a letter to Elizabeth Lee telling her all about it. For the best reply received by March 1, 1929, the G. Y. C. will award \$10.00.

A G. Y. C. Member originated this contest. She is Lois M. Johnson of Volga, South Dakota. Lois has a special problem, too. This is it. "Living quite far from the town where I go to school, I ride in on horseback. This presents a difficult problem. Riding-clothes are scarcely suitable

for school, so this is what I do. I wear my regular school clothes and in addition a pair of heavy gloves and a pair of sport stockings over light stockings. So I manage to arrive feeling fairly presentable."

No matter what your problem is, write to Elizabeth Lee about it and tell her how you are solving it. Make your letter as long as you wish, but be sure to get it to her at 8 Arlington Street, Boston, Mass., by March 1. This contest is open to any girl who reads The Youth's Companion.

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THE

CHILDREN'S



For the washtub was a large stone-bordered pool out in the field

Nanette and Jean-Pierre Discover a Secret

Written and illustrated by Esther Brann

CLATTER-CLAP! Clatter-clap! Nanette loved the clatter of her *sabots* on the rough cobblestones outside the Cottage door. *Sabots* are wooden shoes, you know, in Brittany. All the girls and boys in Brittany wear *sabots*.

Clatter-clap! Clatter-clap! So important, so cheery! Quite the noisiest pair of wooden shoes in town, Grandmere always said. Old Jacquot the cobbler had made them noisy. He had hammered large brass nails round the toes and heels so that they would wear and wear, and clatter and clap, a long, long while.

Nanette lived with Grandmere and the chickens at the lowest end of Geranium Lane. It was called Geranium Lane because each little stone house had pink geraniums growing out in front. Nanette's house had pots of pink geraniums on the window-sill, too—and a downy yellow canary that sang lustily all day long from his cage beside the door.

Many, many things happened down Geranium Lane, but wash-day most of all. For Monday was wash-day. And Tuesday was wash-day. And so was Wednesday and all the other days in the week except Sunday. For in Plou-Las, which was the

name of the village where Nanette lived, all the housewives used the very same wash-tub, and naturally they couldn't all use it at the same time. For the wash-tub was a large, stone-bordered pool out in the field, and Nanette and all the others in Plou-Las called it the Lavoir.

Now Monday was Grandmere's wash-day. Early every Monday morning she bundled the wash into her apron and called to Nanette, "Come, Nanette! The earlier we reach the Lavoir the cleaner the water will be, you know!" Then she locked the door and put the key under the ledge above, and off they went.

Nanette liked wash-day. All the housewives brought their children along with them, and what a fine time they all had together while their mothers were busy! Nanette helped, too, by spreading the wet clothes over the bushes to dry.

Oh, Monday was one of the very best days of the whole week.

But one Monday something very, very strange happened. The Lavoir was almost empty! There wasn't enough water in it to wash a kerchief, not to speak of a family wash! And for as long as Nanette could remember it had always been full. Somebody had raised the gate and let the water out! Who could it be? All the housewives were very cross. Now they would have to wait until the Lavoir filled up again, and that would be a very long time.

"I cannot understand it!" they said to one another very crossly. "Someone must have raised it, for certainly the gate could not raise itself. Who could it be?" And they looked so angry that Nanette was very glad she hadn't raised the gate.

"Perhaps the gate is worn out," suggested Grandmere.

"No," they said. "Look how the water stays in now after we have lowered the gate!" Sure enough, the water was already several inches deep; so the gate was all right.

"It must be somebody's bad child," said the housewives. And everybody looked severely at everybody else's child, and not her own.

"I didn't raise the gate," said Nanette.

"I didn't either," said Jean-Pierre.

"Neither did we," said all the other children.

Nobody did it then! But still the gate was raised, and the water ran out.

"Who do you think raised it?" Nanette whispered to Jean-Pierre.

"I didn't," Jean-Pierre whispered back.

"Oh, Jean-Pierre," Nanette whispered then, "let's us find out who did. Let's steal out to-night and watch! Then think how surprised everyone will be when we discover who lets the water out!"

"All right," agreed Jean-Pierre just as excited as Nanette. "I'll meet you here at the Lavoir as soon as it grows dark and everyone is asleep."

So that night Nanette pattered up the lane in soft slippers. Meanwhile Jean-Pierre too had stolen out of his house and was going toward the Lavoir. And Nanette and Jean-Pierre reached the Lavoir at exactly the same

time, which was very fortunate, for everything seemed pretty dark around them. Very, very quietly they both went up to the side of the Lavoir. There it was, as full of water as could be. No one had come yet to open the dam. And there wasn't anyone else about, either—just an old goat with a long wise beard who was tied to the bushes near by.

"Let's hide, Jean-Pierre, before anyone comes," said Nanette in a small voice.

But nobody came. Nanette and Jean-Pierre grew sleepier and sleepier. Soon they were fast asleep, their heads on each other's shoulders.

Now out in the moonlight the old goat still ate away. Nobody to look at him would have known he didn't think much of the grass where he was. Nobody would have known that he knew the grass on the other side of the Lavoir was much more luscious and tender. He was a wise old goat. He ate and ate where his mistress tied him, because he knew something else. He knew his rope was nice and long.

So he ate and ate right where he was, and then—he walked straight down to the wooden gate of the Lavoir, lowered his horns and tugged with all his might. Up came the gate. Gurgle, gurgle, the water began to run out from the Lavoir. Gurgle, gurgle, in a minute everything would be nice and dry for him to cross over.



The old goat who had made all the trouble didn't even look guilty!

Nanette woke suddenly. What was that? She rubbed her eyes. The water! The water was indeed running out from the Lavoir, gurgling merrily. And there was the old goat, holding up the gate with his horns and looking much pleased and satisfied.

They pulled the wooden gate from the old goat's horns and put it into place, so that there would be plenty of water for the housewives in the morning; and they tied the old goat on the other side, where the grass was luscious and tender; and then they went home in the moonlight as pleased with themselves as the old goat was with his own cleverness.

But as Nanette went down Geranium Lane she was not the only one who was up. Grandmere's neighbor was standing behind her window, and Grandmere's neighbor didn't especially like little girls.

Next morning Grandmere's neighbor called on a neighbor. "Good morning," she said, "have you heard the news? It is Nanette who lets the water out from the Lavoir. Last night I saw her with my own eyes. She passed by my house when all good little girls were asleep in bed. She was coming from the Lavoir. I go now to tell her Grandmere."

"I will go with you," said the housewife. "But first let us tell my neighbor."

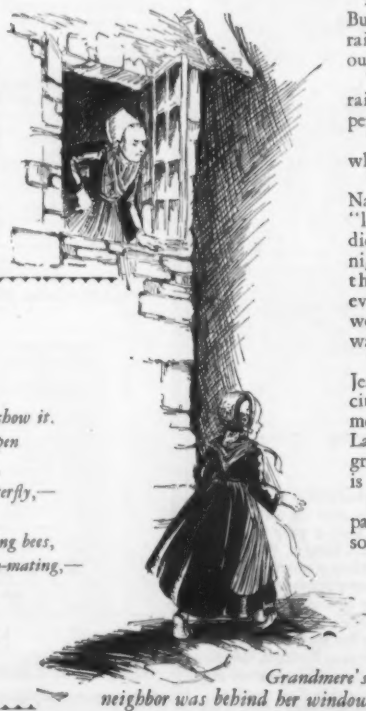
So they stopped at every house in Geranium Lane to tell the news. And by the time they reached Nanette's house all the housewives who lived in the lane were there to tell Grandmere about Nanette. Grandmere came to the door when they knocked and was very much surprised to see all her neighbors. "What has happened?" she asked.

Ambition

By Edna Randolph Worrell

My sister says she wants to be
A cook and do the baking,
And put up jam and marmalade,
And learn the candy-making,
And try the new desserts, and frost
The cakes until they glisten;
To hear her talk it fairly makes
You hungry, just to listen.
And yet when I'm grown up I'm sure
I'd rather be a poet;
For if a cook should pause to dream,

Her ruined work would show it.
But if I threw aside my pen
To pick a coaxing daisy,
Or chase a wayward butterfly,—
Or if I just was lazy
And listened to the droning bees,
And watched the birds a-mating,—
My work would keep,
and be perhaps
Much better for the wait-
ing.



Grandmere's neighbor was behind her window

PAGES

They all looked very solemn. "Where is Nanette?" they asked.

"Nanette is a sleepy-head this morning," answered Grandmere. "She hasn't waked up yet."

The neighbors all looked at one another and nodded. "No wonder she is a sleepy-head," sniffed Grandmere's neighbor who didn't especially like little girls. "It was your Nanette who stole out last night to raise the gate of the Lavoir. I have seen her. With my own eyes I have seen her."

"But that is impossible," Grandmere exclaimed indignantly. "Nanette was fast asleep in her bed all the night through. She will tell you so herself." And she called Nanette.

"Yes, I went out, but—" began the little Nanette. But the housewives would not let her finish. They glared at her furiously, and all started to talk at once. "There! You see? I told you so!"

"But no!" Nanette shouted over the

clamor. "The Lavoir is full of water this morning. Go and see!"

"We don't believe it," declared the housewives angrily. "But come!" And they all walked down Geranium Lane toward the Lavoir. Sure enough, it was full of water.

"There! You see?" said Nanette. "It wasn't I who emptied the Lavoir. It was the old goat who did it with his horns! Jean-Pierre and I waited up and saw him. He wanted to get to the grass on the other side. See, we tied him there, and that is why there is water in the Lavoir this morning."

Of course all the housewives were very much pleased that Nanette had discovered the culprit—all, that is, except Grandmere's neighbor who didn't especially like little girls. She was cross because she knew that after that the other housewives would not believe any of her stories.

But the old goat who had made all the trouble didn't even look guilty!

You will find more stories about Nanette and her friends in her own book called "Nanette of the Wooden Shoes," by Esther Brann, soon to be published by the MacMillan Company. It is a lovely book!

The Magic Merry-Go-Round

Betty and Jimmy Make Valentines

By Marjorie Hartwell

IT was exactly one week before Valentine's Day that Betty's and Jimmy's Aunt Jane came to see them again. She hadn't been there since Christmas, when they had all made presents together, so you can imagine how delighted Betty and Jimmy were when they could go down to the station with their mother to meet her. When they were coming home in the taxi, there wasn't a minute when someone wasn't talking, telling Aunt Jane everything that had been happening. And then, before they knew it, there was Aunt Jane coming into the play-room with the most exciting package in her hands.

"Surprise! Surprise!" she cried in that gay voice of hers they adored. "Surprise for Betty and Jimmy."

From the shape of the package they couldn't imagine what was in it. But Aunt Jane didn't keep them waiting. She told Jimmy he might take the wrapping off and Betty that she could take the cover from the box—and there inside were some paper-flower pictures and some red paper and a little bag of candy hearts and some ribbon and some thin white cardboard and some heavy brown paper!

"To make valentines with!" cried Aunt Jane. "The cutest little valentine paper baskets you ever did see. And the cunning-

est bear valentine with a door that opens and shuts and the bear bobbing up at the window and then at the door. See, here are some pictures to show you just how they will look when they are finished."

Betty and Jimmy looked and saw the very pictures which are here on this page, the valentine basket at the top and the valentine bear-house at the bottom.

"I'll make the bear-house," said Jimmy right away.

Betty wasn't so sure. "Where do the candy hearts go, Aunt Jane?" she asked.

Aunt Jane laughed and laughed at that. "Some of them into two red mouths!" she told them. "And the rest into the valentine baskets. And if there aren't enough, I know a place, I do, where there are some more."

After Betty and Jimmy had helped themselves to some of the candy hearts, and after they had read all the comical mottoes on the rest, with Aunt Jane's help on the long words, they started in.

And because I know you will want to make some valentine baskets, too, and a valentine bear-house, I am going to tell you just how to do it.

To make a valentine basket, cut two pieces of red paper 8 inches long and 2½ inches wide. Lay them together and fold them crosswise in the middle. Draw a line across the paper 2½ inches from the folded edge. Mark every ½ inch on this line and on the folded edge. Connect the marks with lines. Cut on these four lines, making five strips (Fig. 1). Separate the two papers and start weaving (Fig. 2). Always weave between the two layers of the strip. When you have finished weaving you will have a heart-shaped basket (Fig. 3).

Some cut-out paper flowers pasted on the basket make it even more attractive. Tuck a written valentine greeting inside. If you want to fill the basket with candy hearts like Betty's and Jimmy's, make a handle for it. Punch four holes in the top. Tie one end of a piece of ribbon through each hole, then tie the other ends of the four pieces together.

To make the valentine bear-house, place a piece of thin paper over the illustration and carefully trace A, B, C, D, E, F and G. Transfer the house (A) to thin white cardboard, and cut it out on the heavy outlines. Cut the door on the left side and top, and the little slit on the lower right side. Johnny Bear (B) is very life-like cut from heavy brown paper. Draw his face on both sides. Cut pieces D and E from green cardboard. Cut a red paper chimney (C), and a heart (F), and two little red coats (G).

Glue a coat on each side of Johnny Bear. The green piece (E) is glued to the right side of the door at the top, to look like a hinge. Glue the straight end of D on Johnny's legs (see



Fig. 1

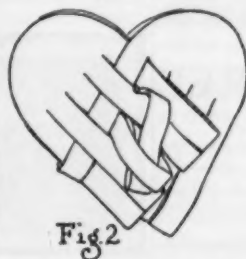


Fig. 2

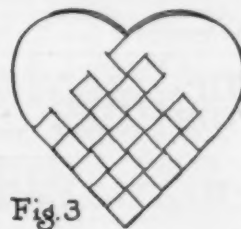


Fig. 3

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Betty wasn't so sure. "Where do the candy hearts go, Aunt Jane?" she asked.

Aunt Jane laughed and laughed at that. "Some of them into two red mouths!" she told them. "And the rest into the valentine baskets. And if there aren't enough, I know a place, I do, where there are some more."

After Betty and Jimmy had helped themselves to some of the candy hearts, and after they had read all the comical mottoes on the rest, with Aunt Jane's help on the long words, they started in.

And because I know you will want to make some valentine baskets, too, and a valentine bear-house, I am going to tell you just how to do it.

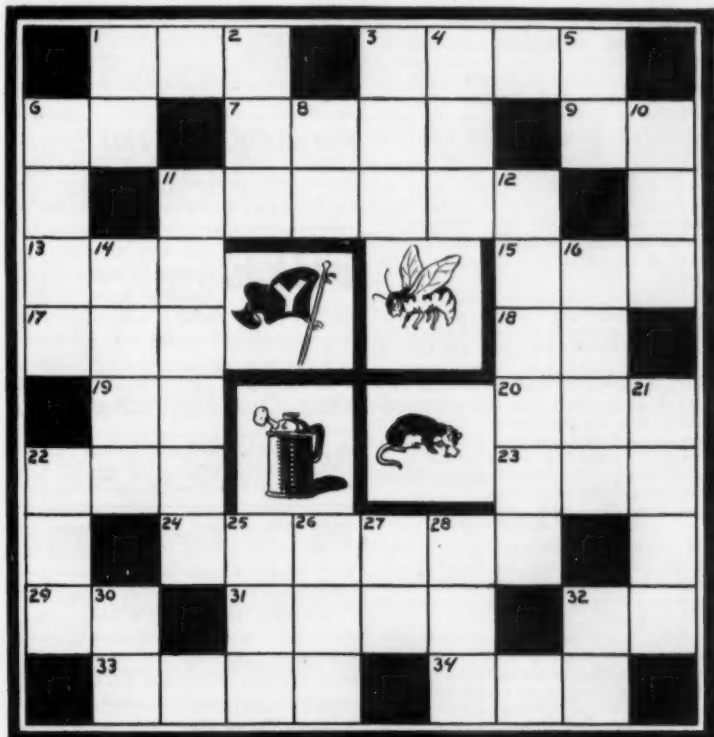
To make a valentine basket, cut two pieces

of red paper 8 inches long and 2½ inches wide. Lay them together and fold them crosswise in the middle. Draw a line across the paper 2½ inches from the folded edge. Mark every ½ inch on this line and on the folded edge. Connect the marks with lines. Cut on these four lines, making five strips (Fig. 1). Separate the two papers and start weaving (Fig. 2). Always weave between the two layers of the strip. When you have finished weaving you will have a heart-shaped basket (Fig. 3).

Some cut-out paper flowers pasted on the basket make it even more attractive. Tuck a written valentine greeting inside. If you want to fill the basket with candy hearts like Betty's and Jimmy's, make a handle for it. Punch four holes in the top. Tie one end of a piece of ribbon through each hole, then tie the other ends of the four pieces together.

To make the valentine bear-house, place a piece of thin paper over the illustration and carefully trace A, B, C, D, E, F and G. Transfer the house (A) to thin white cardboard, and cut it out on the heavy outlines. Cut the door on the left side and top, and the little slit on the lower right side. Johnny Bear (B) is very life-like cut from heavy brown paper. Draw his face on both sides. Cut pieces D and E from green cardboard. Cut a red paper chimney (C), and a heart (F), and two little red coats (G).

Glue a coat on each side of Johnny Bear. The green piece (E) is glued to the right side of the door at the top, to look like a hinge. Glue the straight end of D on Johnny's legs (see



The Children's Cross-Word Puzzle

ACROSS

1. What a boy calls his sister.
3. Dog's name.
6. Old-fashioned "you."
7. Settled.
9. Location of capital of U. S. (abbreviation).
11. There's one in every circus.
13. Meadow.
15. A grain.
17. Part of the body.
18. Baseball position (abbreviation).
19. Name of Columbus' ship (abbreviation).
20. Strife.
22. Picture (upper right).
23. Part of verb to be.
24. Prayer beads.
29. Depart.
31. Small quantity.
32. Kind of pipe.
33. Oven used in making bricks.
34. Part of body.

DOWN

1. Point of compass.
2. Watering place.
3. Boy's name.
4. Girl's name.
5. Boy's name.
6. Picture (upper left).
8. Preposition.
10. A pet.
11. Tiller of the soil.

12. A European country.
14. What lazy folk like.
16. Distant.
22. Insect.
25. Picture (lower left).
26. Member of the family.
27. By.
28. Picture (lower right).
30. All right (abbreviation).
32. Initials of a famous inventor.

[ANSWERS WILL BE PRINTED NEXT MONTH]



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STAMPS TO STICK

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Roumania celebrates the fiftieth anniversary of the annexation of Dobruja; Czechoslovakia commemorates the tenth year of its existence as a republic; Prince John II of Liechtenstein has been reigning seventy years and issues a stamp to prove it

BEGINNERS' ALBUMS

An aunt who has been reading The Companion's stamp page inquires as to what kind of albums she should purchase for nephews who are about to pursue the hobby called philately.

The beginner should start off with a book which is inexpensive. Album prices range from less than a dollar to as high as \$140 or more. Small hands are apt to be soiled, notwithstanding parental care and caution—and those small hands constantly finger an album when their owners get the stamp "fever" after discovering that the hobby is fascinating. A costly album for the newcomer is an expensive mistake, as experience has repeatedly proven.

Some dealers sell an album as low as sixty cents, and this is just what the beginner should have and all that he needs. Such a book, nine and one-half by seven inches in size, contains more than one hundred pages with spaces for approximately four thousand stamps, and this is sufficient for early collecting.

As time goes on and the beginner learns the value of keeping the collection neatly and of putting only clean and undamaged stamps in the album, a larger and more expensive book will then be desirable.



Chile's first air-mail series; a surcharge from the new set

after the collector has been graduated from the beginner's stage and has indicated that his interest in philately is going to continue.

Perhaps the ideal gift for the lady's nephews, one for each boy, is what one dealer calls "a complete beginning collector's outfit." This includes the sixty-cent album, three hundred different foreign stamps, one thousand hinges, a millimeter scale for measuring perforations, and a small booklet which is an informative guide to the hobby. Such a combination may be had for \$1—and the novice is started off the right way! The Companion stamp editor will be glad to advise where such an outfit can be purchased.

STAMP NEWS

Commemoratives

SUPPLEMENTING Albania's series, mentioned on the December page, bearing the surcharge of August 25, to signify the change from a republic to a monarchy, another set from this Balkan land carries an overprinted inscription including "Zog I" and "IX 1928," and these later stamps were issued to commemorate King Zog's coronation. After the stamps had appeared the coronation ceremony was deferred until early in 1929. Thus we have curious stamps which carry a date which "commemorates" something which did not take place!

As part of Austria's celebration of "Republic Day" in 1928—November 12, the tenth anniversary of the change from an empire—a series appeared with the head of Michael Hainisch, then President, as the design. Each sold at double face value, and the extra revenue went to charity.

The tenth anniversary of the establishment of the republic of Czechoslovakia brought a long pictorial set on October 18. Notable buildings in Slovakia, Ruthenia, Bohemia, Moravia, etc., are illustrated, while the 3 kronen, sepi, bears a likeness of President Masaryk.

To mark the tenth anniversary, November 18, of national independence, Latvia distributed two

sets, each in values of 6, 15, 20, 30 and 50 centimes and 1 lat. The first has pictorial designs, including the National Theater where the republic's liberty officially dawned. The other is for the benefit of a society which is planning a liberty memorial, the designs including Latvian views, a war-time scene and a figure symbolical of the republic.

The silver anniversary of Panama's independence as a republic in its own right was celebrated on November 3, and that date, with the years 1903 and 1928, was surcharged in red on Panama's 2 centesimos, deep green, of the 1921 series.

At the end of a half-century since Rumania annexed Dobruja, the Balkan kingdom late in 1928 issued commemoratives in values of 1, 2, 3, 5, 7 1/2, 10 and 20 lei, the designs showing the port of Constanza, the Adam Clissi monument, the bridge at Cernavoda, and, on the lowest denominations, portraits of the late King Ferdinand and the present boy ruler, Michael.

Prince John II, now eighty-eight years old, had reigned over Liechtenstein seventy years this past November, and the tiny principality issued a jubilee series with the dates 1858 and 1928 inscribed and with portraits of Prince John as he looked in the earlier year and as he appears today.

Four Italian colonies—Cyrenaica, Eritrea, Italian Somaliland and Tripolitania—have each issued a set, similar in design and in the face values of 20, 30 and 50 centesimi and 1.25 lire, to recall the founding of the Italian African Society, organized to develop the Latin kingdom's possessions in Africa. These stamps are inscribed with the organization's name and the dates 1882 and 1928, and each sells at a slight advance, the extra funds being devoted to the society's work. The design includes a Roman galley and a medley of emblems.

Philatelic Exhibitions

AN Australian philatelic exhibition was held in Melbourne recently, and the government put forth a commemorative, on sale only at the stamp show. It is a 3 pence, picturing the native kookaburra.

Helsingfors was the scene of the local philatelic association's stamp exhibition in November, and Finland overprinted the current 1 and 1 1/2 marks values to commemorate the occasion.

The fifth centenary of the success of Joan of Arc at Orleans, is to be celebrated throughout France during 1929, and a special stamp will appear in memory of the Maid of Orleans.

Other Newcomers

CHILE has issued its first air-mail stamps—seven values of the 1925-28 regular series, surcharged with a bird and the words "Correo Aereo."

Germany has distributed a colorful semi-postal charity set—5, 8, 15, 25 and 50 pfennings bearing the coats-of-arms of Hamburg, Mecklenburg-Schwerin, Oldenburg, Brunswick and Anhalt. Each sells at approximately double face value.

Australia's first air-mail stamp, to mark the opening of the Adelaide-Perth trans-continental route in April, will be a 3 pence, with the design showing a plane above a horseman and a flock of sheep.

Every Christmas time from 1915 to date, Switzerland has issued a semi-postal *pro juvenibus* (for the children) series to raise money to fight tuberculosis among boys and girls. The recent contributions show the coat-of-arms of Lausanne on the 5 centimes, of Winterthur on the 10 centimes and of Saint Gall on the 20 centimes, while on the 30 centimes is a portrait of Henri Dunant, who, founder of the international Red Cross, was born in 1828.



The coat of arms of Oldenburg on a new German charity set

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